# FIELD CROP ABSTRACTS

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# FIELD CROP ABSTRACTS

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The locality shown in square brackets in the Title Heading indicates where the work reported was carried out.

For abstracts dealing with plantation crops, including sisal, sugar-cane and tobacco, see *Horticultural Abstracts.*

# CEREALS

## WHEAT

Grado, A. de. Experiencia sobre el efecto de la escarda en el cultivo de trigo, año 1951-52, y resumen de seis años de experiencia. [**Experiment on the effect of hoeing on the cultivation of wheat, 1951-52, and summary of six years' trial.**] *An. Inst. nac. Invest. agron.* 1953, **2,** No. 1, 53-61. [Granja Agríc., Badajoz, Spain]

The material comprised the wheat varieties Leciñena 04, replaced in 1951 by Coruche 06, and Capelli, and the trial, sown in random blocks with 4 replications, tested the effect of sowing at he rate of 80 and 120 kg. per ha., respectively, and f hoeing or not hoeing. Over the 6 years the heavier seeding rate produced a slight but significant improvement in yield : the slight improvement due to hoeing was not statistically significant. —G.M.R.

2 Zanini, E. Le colture da rinnovo per i territori meridionali caldo-aridi non irrigabili. [**Renovating crops for the non-irrigable warm-arid regions of southern Italy.**] *Humus* 1953, **9,** No. 9, 8-13, illus.

The renovating crops which are grown before wheat in southern Italy are reviewed. The following hoed crops appear to be of increasing interest : cotton, sunflower (both grown during spring-summer) and sugar-beet (grown during autumn-spring).—E.B.O.

3 Argentina. Ministerio de Agricultura y Ganaderia. Consejos de siembra de trigo para el año 1953. [**Advice on wheat sowing in 1953.**] *Misc. Publ. 369. Minist. Agric. Ganad. Argent.* 1953, pp. 15, map.

The wheat-growing area of Argentina is mapped, 7 regions and sub-regions of different ecological character being distinguished. The wheat varieties recommended for each are listed, with brief notes on their characteristics and optimum sowing times. —G.M.R.

4 Laude, H. H. and others. **Ponca winter wheat.** *Bull. 254. Kans. agric. Exp. Sta.* 1952, pp. 14, illus.

Ponca is adapted to eastern Kansas and to all Oklahoma except the extreme north-west. It possesses the highest degree of resistance to hessian fly [*Phytophaga destructor*] of any commercial variety of hard, red, winter wheat and the highest resistance to leaf rust of any variety in the Central Plains region. In yield trials in eastern Oklahoma during 1945-51, Ponca gave average yields of 26.8 bu. per ac. compared with 25.8 bu. for Comanche, 24.2 bu. for Wichita and 23.4 bu. for Triumph. In western Oklahoma, Westar gave the highest average yields, with 23.3 bu. per ac., followed by Wichita, Triumph, Comanche and Ponca with 22.1, 21.4, 21.4 and 21.3 bu. per ac., respectively. In eastern Kansas, respective mean yields of Ponca and Pawnee during 1943-51 were 29.1 and 29.5 bu. per ac., in western Kansas, respective yields were 27.2 and 26.6 bu. per ac. Ponca has proved somewhat less winter-hardy than Pawnee and Comanche. [See also *Fld Crop Abstr.* 6 : 492.]—P.J.B.

5 Canada Department of Agriculture. Associate Committee on Plant Breeding. **Report on co-operative tests of wheat varieties, 1952.** 1953, pp. 20.

The 1952 trials were carried out with 30 varieties at 23 locations in the Prairie Provinces. In Manitoba and the Black Soil zones of Saskatchewan, average yields were highest for a Mida-Cadet × (R.L. 2265 × Redman) cross with 46.9 bu. per ac., and a Thatcher-Red Bobs × C-26-44.7-Thatcher cross, with 45.8 bu. per ac. In the Black and Grey Soil zones, a Comet-Apex × Thatcher cross gave the highest average yields, with 74 bu. per ac., followed by a Thatcher-Red Bobs × C-26-44.7-Thatcher cross, with 71.7 bu. and Redman, with 69.3 bu. per ac. In the Brown Soil zones of Saskatchewan and Alberta, a Comet-Apex × Thatcher cross gave the highest mean yield of 50.8 bu. per ac., followed by Thatcher-Red Bobs × C-26-44.7-Thatcher cross, with 50.6 bu. per ac.—P.J.B.

6 Canada Department of Agriculture. Associate Committee on Plant Breeding. **Report on co-operative tests of durum wheat varieties, 1952.** 1953, pp. 9.

A summarized account is given of co-operative tests with the following varieties at 4 locations in Manitoba, 3 in Saskatchewan, and 1 in Alberta and N. Dakota : Mindum, Golden Ball, Carleton, Stewart 221, Nugget, two 1742 × Carleton crosses, two Pellissier × Carleton crosses, four (1742 × Carleton) × 3040 crosses and three N. Dakota multiple crosses. Two-year, 3-year and 4-year mean yields at all stations are given. Two-year averages (1951-2) were headed by Golden Ball with 34.8 bu. per ac. and Stewart 221 with 34.2 bu. per ac. Three year averages (1950-2) were headed by Stewart 221, 35.3 bu. and Golden Ball, 35.1 bu., and Mindum, 35 bu. per ac. Four-year averages (1949-52) were headed by a N. Dakota selection of (Heiti × Stewart) × (Mindum × Carleton), with

38.8 bu. per ac. and Stewart 221, 33.8 bu. per ac. —P.J.B.

7 Gurčenko, V. S. [**A high-yielding variety of spring wheat.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 4, 44-7.
The variety Artemovka (Lutescens 1418) is described. It was produced by the Stalinsk [formerly Novokuznetsk] State Breeding Station by selection from a local spring wheat of the Kremenčug Province. The variety is promising for the steppe and forest/steppe province of the Ukraine. The vegetative period of Artemovka fluctuates between 89 and 102 days. It ripens early in the steppe zone but much later in the forest/steppe area.—M.H.

8 Voropaev, A. A. [**Grain quality in varieties of crops promising for Siberian conditions.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 3, 24-7. [Siberian Sci. Res. Inst. Grain Husb.]
In extensive regions of Siberia, spring wheat is a crop of primary importance and in recent years the areas sown to wheat have increased. The variety Caesium III is most suitable for Siberian conditions, but, following curtailment of its production during the war years, re-establishment of this variety has been slow. In recent years Albidum 3700 has also been proved valuable for Siberian grain husbandry. An account is given of several wheat varieties bred at different centres (e.g. Novosibirsk, Šortandinsk, Čeljabinsk, Narym, etc.). It is maintained that at present there is a need for early-ripening types of spring wheat for eastern regions of USSR.—M.H.

9 Kučumov, P. V. and Zdriljko, A. F. [**Varieties of spring wheat under irrigation.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 3, 45-50. [Inst. Genet. and Sel., Acad. Sci., Ukraine SSR]
The work contains information on the following features in different varieties of spring wheat, grown with and without irrigation : characteristics in relation to phenological factors ; quantitative features (length of main ear, number of grains per ear, weight of grain on main ear, plant height) ; grain yield ; and damage to plants by insects.—M.H.

10 Pronin, V. A. [**Artificial mixtures of spring wheat varieties in the Penza Province.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 10, 27-31, bibl. in text. [Petrovsk State Breed. Sta.]
It has been reported [*Fld Crop Abstr.* 3 : 100] that artificially compounded mixtures of wheat varieties frequently give higher yields than those obtained from pure sowings of a single variety. The inter-relationships of components of an artificially compounded mixture of wheat varieties forms the subject of this paper. Details are reported in *Pl. Breed. Abstr.* 23 : 1851.—M.H.

11 Gasparini, M. Un nuovo frumento. Il " Verna " per la montagna. [**Verna, a new wheat variety for the mountains.**] *G. Agric. Domen.* 1953, **63,** No. 37, 283, illus. [Ist. Agron. Gen., Univ. Firenze, Italy]
The autumn wheat variety Verna (Est Mottin 72 × Mont Calme 245), resistant to cold and rust, is suitable for cultivation on acid soils of medium to good fertility, at altitudes of over 650 m. a.s.l. in Italy. It should be sown early using 170-200 kg. of seed per ha. Under conditions of medium fertility it yielded 3000-3500 kg. of grain per ha.—E.B.O.

12 Maliani, C. Nota descrittiva sul nuovo frumento " G. Giuliari " (autunnale, tenero, mutico, precoce). [**A descriptive note on "G. Giuliari ", a new autumn, soft, awnless, early wheat variety.**] *Genet. agr.* 1953, **3,** No. 3-4, 427-8, illus. [Ist. Tecn. agr. N. Strampelli, Lonigo, Vicenza, Italy]

13 De Cillis, U. Lo stato attuale della diffusione delle varietà elette di frumento in Italia. [**The present distribution of selected wheat varieties in Italy.**] *Genet. agr.* 1953, **3,** No. 3-4, 293-315, bibl. 2. [Sta. Sper. Granicolt., Rieti, Italy]

14 Lutri, I. Nuovi grani duri e teneri creati in Sicilia. [**New durum and soft wheat varieties bred in Sicily.**] *Genet. agr.* 1953, **3,** No. 3-4, 373-87, bibl. 3.
Early wheat varieties are considered preferable for cultivation in Sicily where wheat crops suffer from drought and " stretta" (shrivelling of the grain by the sun). Sicilia, a hard hybrid (Rossello × Azizia) grown in Ragusa province, is not sufficiently early for the Sicilian environment. Agrella, a soft hybrid bred from Maiorca bianca × Mentana, is very early. Three different biotypes were isolated from this hybrid, Agrella 1 being suitable for cultivation in warm coastal areas in poor soils, while Agrella 2 and Agrella 3 are suitable for cooler regions in Sicily and southern Italy.—E.B.O.

15 Grado, A. de. Ensayo comparativo de variedades de trigo. Cultivo de trigo en ciclo corto. Estudio sobre hibridación de trigos. Selección de avenas por líneas puras y ensayo de variedades de maíces. [**Wheat varietal trial. Short-term cultivation of wheat. Wheat hybridization experiment. Selection of oats for pure lines. Maize varietal trial.**] *An. Inst. nac. Invest. agron.* 1953, **2.** No. 1, 75-90. [Granja Agríc., Badajoz, Spain]

Material was tested for use in the Guadiana basin of Estremadura. In the trial of short-term cultivation, wheat was sown on 18 February, instead of on 28 November of the previous year, and harvested in June.—G.M.R.

16 ZUAZUA, A. B. Experiencia de variedades de trigos de primavera. [**Varietal trial of spring wheats.**] *An. Inst. nac. Invest. agron.* 1953, **2,** No. 1, 63-73. [Cent. Cuenca del Duero, Valladolid, Spain]

Spring wheat varieties combining a short growing season with a high degree of productivity are sought for the irrigated lands of the Duero basin, where the crop is of economic importance and is customarily grown after sugar-beet. Ten varieties were tested in 1952, the second year of the trial, and results confirmed those obtained in 1951. Pinyte and Mentana, in this order, proved superior to all others.—G.M.R.

17 PASCALE, A. J. Comportamiento fotoperiódico de algunos trigos Argentinos. [**Photoperiodic behaviour of some Argentinian wheats.**] *Meteoros* 1953, **3,** No. 1, 97-112, bibl. 20, illus., English summary p. 97. [Agromet. Obs., Gastelar, Argent.]

As a result of observations made, over a period of 2 years, on the development of a number of wheat varieties sown at various dates between March and October, Argentinian wheats were divided into the following 3 main groups on the basis of their photoperiodic and cold requirements: (a) varieties which require long days (14 hr. or more) in order to reach the reproductive phase and which have only a moderate cold-requirement, (b) varieties which require only a moderately long day (12-14 hr.) in order to enter the reproductive phase and which have a well-defined cold-requirement, (c) varieties which can be sown late in spring, are indifferent to the length of the photoperiod and have no cold-requirement.—W.J.B.

18 MICHAJLIKOV, V. and JUAREZ, G. A. Tres años de experiencias de temple contra la sequía en trigo y en maíz. [**The effect of alternate drying and moistening of seeds on the drought-resistance of wheat and maize: a three-year experiment.**] *Meteoros* 1953, **3,** No. 1, 54-80, bibl. 17, illus., English summary p. 54. [Guatraché and Castelar Agromet. Stas, Argent.]

Seeds of wheat and maize were alternatively moistened and dried, according to Henkel's method, before being sown in replicated experiments at two stations over a period of three years, 1949-51. In all years, treated seed gave greater yields of wheat grain than the controls (untreated seed). In the only year in which there was a notable deficiency of rainfall, 1949, treated seed of the wheat varieties Sinvalocho, Klein Exito and Benvenuto Inca gave highly significant increases of yield over the control of 39, 27 and 21%, respectively. Generally, the increases in yield over the control, obtained by treating the seed, differed significantly between varieties. In the experiments with maize, there were no consistently significant results, although the maize plants appeared to benefit, in times of drought, from the seed treatment.—W.J.B.

19 KAIHARA, H. **Studies on the quality of wheat. 2. Variation in four kinds of soluble protein of wheat grains by some treatments of nitrogenous fertilizers.** [Japanese, with tables in English] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 256-7, English summary p. 257. [Ohara Inst. Agric. Res., Okayama Univ.]

Ammonium sulphate was applied to a winter wheat crop at varying rates and at varying times of the year while P and K were applied at a standard rate to all plots at sowing time. The results of the experiment are tabulated. The various N treatments influenced the percentage contents of gliadin and glutenin in the wheat grain but had no significant influence on the content of leucosin and globulin. Insufficient supplies of N to the plants had a detrimental effect on the protein content and gluten quality of the grain.—W.J.B.

20 ARGENTINA. Ministry of Foreign Trade, Grain Department. Malezas presentes en los cultivos de trigo. [**Survey of the quantities of weeds in wheat crops.**] *Bol. Direcc. nac. Gran. Elev.* 1952, **13,** No. 3, 144-91, bibl. 8, illus.

Calculations, based on analyses of samples of grain, were made of the weights of seed per ha. yielded by 20 different species of weed occurring in wheat crops in each department of the chief wheat-growing provinces of Argentina over the period 1945-50. Maps illustrate the frequency of occurrence of each weed (as represented by the yield of weed seeds per ha.) in each department. Graphs illustrate the fluctuations in the frequency of occurrence in grain samples of each weed over the whole period.—W.J.B.

21 RIBEIRO, M. A. do V. O ácido 2,4-diclorofenoxiacético no combate às infestantes das searas de trigos na lezíria de Sacavém. [**The effect of 2,4-D on weeds of wheat grown at Sacavém.**] *Agron. lusit.* 1952, **14,** No. 4, 271-82, bibl. 11, illus., English summary p. 281. [Nat. Agron. Sta., Sacavém, Portugal]

The results of tests carried out on wheat fields in 1950-2 with the sodium salt of 2,4-D used at the rates of 1, 3 and 5 kg. per ha. are reported. The degrees of susceptibility of various weeds are tabulated. One of the commonest weeds in the area, *Lepidium draba*, was successfully controlled by the use of 2,4-D. *Oxalis cernua*, usually considered resistant to 2,4-D, proved to be partially susceptible. There was no notable difference in the degree of control obtained at different rates of application.—W.J.B.

22 WILLIS, S. J. **Ergot in wheat variety trials in Hertfordshire.** *Pl. Path.* 1953, **2,** No. 1, 34-5, bibl. 4. [Herts. Inst. Agric., St. Albans]

Counts of ergots (*Claviceps purpurea*) in a relatively severely attacked wheat trial plot indicated the existence of differential susceptibility to this fungus in the 12 varieties concerned. In considering the economic significance of the attack, it was found that even the most susceptible variety contained no more than 0.02% by weight of ergots, so that there seems little cause for alarm.—G.M.R.

23 TRENTIN, A. Prove contro la carie. [**Trials of bunt control.**] *Ital. agric.* 1953, **90,** No. 6, 414-20, bibl. 18, illus. [Ist. Tecn. Agr. N. Strampelli, Lonigo, Italy]

An account is given of trials to compare several commercial preparations (dusts) for controlling bunt (*Tilletia tritici* and *T. laevis*) which is causing increasingly serious damage to wheat crops in Italy. Results indicated that the benzene hexachloride dusts were particularly effective.—E.B.O.

24 GLYNNE, M. D. and SALT, G. A. **Cereal foot and root rots** [**eyespot and take-all**]. *Rep. Rothamst. exp. Sta. 1952* Harpenden, 1953, 90-1.

The effects of different types of cropping and of sulphuric acid sprays on the infection of wheat by eyespot (*Cercosporella herpotrichoides*) and take-all (*Ophiobolus graminis*) were determined. In one experiment, 77% of the straws of wheat plants following wheat were infected with eyespot and 14% of the plants were infected with take-all at harvest. On plots in this experiment where neither wheat nor barley were grown in the previous year, the percentages were reduced to 38 and 2%, respectively. Eyespot was reduced to 1% and there was no take-all on plots where potatoes were grown in the previous two years. Similar results were obtained in other experiments. In another experiment, spraying with sulphuric acid in March reduced eyespot in wheat from 88 to 39% and the lodged area from 95 to 36% in the case of Squarehead's Master, and eyespot from 84 to 34% and the lodged area from 54 to 1% in the case of Bersée. In the same experiment decreasing the seed rate from 3 to 1.5 bu. per ac. decreased lodging and increased the yield of grain by 4 and 5 cwt. per ac. in unsprayed and by 1 and 3 cwt. per ac. in acid-sprayed plots of Squarehead's Master and Bersée, respectively. Sulphate of ammonia applied in March caused more lodging in both varieties than when applied in October, April or May.—W.J.B.

25 PHILLIPS, W. J. and POOS, F. W. **The wheat strawworm and its control.** *Fmr's Bull. 1323. U.S. Dep. Agric.* 1953, pp. 6, illus.

Practical measures to control *Harmolita grandis* include the avoidance of wheat cultivation within 75 yards of wheat straw, or stubble, from the previous season, the ploughing under of all stubbles and the eradication of volunteer wheat plants.—P.J.B.

26 JONES, E. T. and others. **A new source of wheat jointworm resistance in wheat.** *Trans. Kans. Acad. Sci.* 1952, **55,** No. 4, 427-30, bibl. 2, illus. [Received 1953] [Kans. State Coll., Manhattan]

Data are given on the resistance of 24 *Agropyron* × *Triticum* crosses to: wheat jointworm (*Harmolita tritici*), hessian fly (*Phytophaga destructor*), stem rust (Race 15B) and leaf rust. None of the crosses showed susceptibility to wheat jointworm, while 7 were resistant to hessian fly. A wheat-rye × wheat cross was resistant to wheat jointworm, while Ponca, Vigo and Pawnee common wheats were all highly susceptible.—P.J.B.

27 MEZZETTI, A. Osservazioni sull'anguillulosi radicale dei cereali in Italia. [**Observations on a root disease of cereals caused by a nematode, *Heterodera major*, in Italy.**] *Ann. Sper. agr.* 1953, **7,** No. 3, 743-58, bibl. 6, illus., English summary p. 758. [Lab. Sper. Pat. Veg., Bologna, Italy]

28 DE CILLIS, U. La bianconatura dei grani duri. [**Yellow-berry in durum wheats.**] *Publ. 10. Catania Sta. Sper. Granicolt. Sicilia* 1942, pp. 67, bibl. 76, illus.

In the malady known as yellow-berry, the ratio carbohydrate/gluten is different from that in normal grains, more, it seems, because of a decrease in the gluten content than because of an increase in the carbohydrate content. The incidence of yellow-berry increases from the base to the tip of the spike. The principal cause of the complaint is climatic, mainly a high soil-moisture content during maturation. The only remedy is to grow resistant varieties.—E.B.O.

29 DANJO, T. **On the consumption of the stored foods in the seeds during the germination of cereals. 4. Relation to the sowing depth of wheat, barley and oats.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 203-4, illus., English summary p. 204. [Dep. Agric., Miyazaki Univ.]

he effect of sowing seed of wheat, naked barley, ulled barley and oats at depths of 1, 3 and 5 cm. n the consumption of foods stored in the en-osperms and on the early growth of plants was tudied. The depth of sowing had no effect on the peed at which the consumption of the food re-ources of the endosperm by the growing seedling ook place. In general, the effect of relatively deep s compared with shallow sowing was to increase he weight of the plumules and to decrease that f the radicles. The development of the first, second nd third foliage leaves and the emergence of the eedlings was retarded by relatively deep sowing. —W.J.B.

0 REBSTOCK, T. L. and others. **The effect of sodium trichloroacetate upon the metabolism of wheat seedlings** (*Triticum vulgare* **L.**). *Pl. Physiol.* 1953, **28,** No. 3, 437-42, bibl. 13. [Dep. Agric. Chem., Michigan State Coll., East Lansing, Mich.]

1 MOSOLOV, I. V. and PANOVA, A. V. [**The influence of wheat leaves on yield and protein content of the grain in relation to crop variety.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **88,** No. 1, 161-3, bibl. 1. [All-Union Sci. Res. Inst. Fert., Agrotechnol. and Pedology (VIUAA)]

See also *Fld Crop Abstr.* 5 : 374.] The authors began ests in 1951 to study the reaction to nutrients of different varieties of spring wheat, special attention being given to the role of the leaves. The varieties were Moskovka, Diamant and Fylgia, which are adapted to the podzol zone in the Moscow, Kalinin, Velikoluksk, Pskov and Smolensk provinces, in addition to the Baltic Republics. Moskovka and Diamant are medium-early ripening types and Fylgia is late ripening. The plants were grown in culture vessels containing 9 kg. of soil taken from under a herbage sward on the Barybinsk Experimental Station and each vessel was supplied with the following fertilizers before seed sowing : 0.75 g. N ; 0.5 g. P ; and 0.5 g. K. The data on grain yields and dry weight of straw are given for the following variants : (1) control, no fertilizers ; (2) NK ; 3) PK ; (4) NPK. The Moskovka variety gave the highest grain yield while yields from the other types were lower and did not differ greatly from each other. The pre-sowing application of mineral fertilizers, especially N, augmented the grain yields of all 3 varieties. It is concluded that the reaction of the wheat plants to nutrients is conditioned by the biological peculiarities of the varieties. The type Moskovka appeared to be adapted best to the Moscow environment and is considered as having, potentially, the greatest capacity for producing higher yields than the other two types, Diamant and Fylgia, which are adapted to a moister climate (near the Baltic area). In 1951, when there was a hot period from June to August, with low relative humidity, the upper leaves of Diamant and Fylgia soon withered and grain yield was low. The leaves of Moskovka, on the other hand, remained green for a longer time and therefore plastic substances were synthesized and grain filling continued ; the 1000-grain weight of Moskovka, therefore, was greater than that of the other two varieties. Because of the recognized importance of the role of leaves for plant development and ear initiation, the authors designed experiments to study the role of leaves at a later stage of development in the wheat plant. For this, certain leaves were removed from the Moskovka variety after earing. This defoliation lowered grain yield by 20-30% and it is concluded that leaves are essential to the plant at the time of grain filling. There is also evidence (from the authors' experiments carried out in 1946 with Lutescens 62) that protein in the grain is lowered by leaf removal.—M.H.

32 BASTIANONI, M. L'influenza della temperatura sull'accestimento dei grani autunnali. [**The influence of temperature on tillering in autumn wheats.**] *Riv. Ecol.* 1952, **2,** No. 3, 255-63, English summary pp. 262-3. [Ist. Ecol. Agr., Univ. Perugia, Italy]

Trials with 7 autumn wheat varieties from different sources, each grown at 6 different localities between 46° and 64° N. lat., indicated that an average low temperature favoured tillering, or the reverse of what had been found with March wheat varieties in previous trials [see *Fld Crop Abstr.* 6 : 854].—E.B.O.

33 MOSOLOV, I. V. and others. [**The effect of fertilizers on yield of spring wheat sown on a herbage fallow.**] [Russian] *Sovet. Agron.* (*Soviet Agron.*) 1953, **11,** No. 2, 31-4. [All-Union Sci. Res. Inst. Fert., Agrotechnol. and Pedol.]

Compared with other grain crops, spring wheat is exacting in its nutrient and environmental requirements. Experiments have been made to investigate the effectiveness of different mineral fertilizers on yields and grain quality of the varieties Moskovka and Lutescens 62, the fertilizing regime being : (a) unfertilized ; (b) NK ; (c) NP ; (d) PK ; and (e) NPK. The tabulated data are discussed in regard to : (1) weight of grain and straw obtained from the two varieties when grown (under the conditions outlined) on herbage fallow and after oats ; (2) amount of N (% dry weight) in the two varieties, grown similarly to (1) ; (3) total sugars in % dry substance of the varieties grown as under (1) ; and (4) content of N and of total protein in the grain, of both varieties when grown as (1). —M.H.

34 JOHNSON, P. E. **Balanced nutrition improves winter wheat root survival.** *Bett. Crops* 1953, **37,** No. 3, 6-10, illus. [Agron. Dep., Univ. Illinois, Newton]

Notes are given on the results of trials in Illinois, in which applications of Ca, N, P and K resulted in considerably greater survival of winter wheat plants than where no applications, or unbalanced applications, were made. This effect appeared to be due to the stimulus given to root growth by complete manurial treatments.—P.J.B.

35 GARDINER, H. N. **Nitrogen top dressings of winter wheat.** *Agriculture, Lond.* 1953, **60,** No. 5, 233-7. [Herts. Inst. Agric., England]

In the years 1949-52, trials were carried out with 9 varieties of winter wheat to measure the effect of top-dressings of nitrochalk applied either in April only, or in April and June, on the protein content and yields of grain. Straw yields were not measured. Where no nitrochalk was applied, Bersée, N. 59, Vilmorin 27 and Hybrid 46 gave the highest yields of grain, 26, 25.4, 25.3 and 23.8 cwt. per ac., respectively. The best responses to top-dressings of 2 cwt. nitrochalk applied in April were given by Hybrid 46, Bersée and Atle which yielded, respectively, 7.5, 5.2 and 4.8 cwt. per ac. more grain on treated than on untreated plots. On plots where the application of nitrochalk was repeated in June, an average additional increase of 1 cwt. of grain per ac. was recorded but no additional increase of yield was obtained from Bersée or Hybrid 46. Applications of nitrochalk in May encouraged early ripening and significantly reduced the moisture content of grain at harvest. The protein contents of the grain of each variety grown on untreated plots and the increases in protein content obtained by April and June top-dressings are tabulated. The average crude-protein content of the grain of all varieties, treated and untreated, at 9.7% was far below the figure of 12.1% given in feedingstuffs tables. Yields of crude protein in the grain were increased on the average by 0.5 cwt. per ac. by April top-dressings and a further 0.48 cwt. per ac. by June top-dressings.—W.J.B.

36 WARDEN, R. L. **Response of Thatcher spring wheat to 2,4-D rates applied in low volumes of oil and water.** *Proc. 13th Western Weed Contr. Conf.* 1952, 12-17. [Montana Agric. Exp. Sta., Bozeman]

Notes are given on sterility caused in spring wheat in Montana by aerial applications of not more than 0.5 lb. actual 2,4-D per ac., made, in most cases, at least 20 days before heading. The results of trials made in Montana during 1949-51 are reported. Applications of nil, 0.2, 0.4 and 0.8 lb. 2,4-D acid equivalent per ac. in oil and water carriers resulted in average grain yields of 42.3, 39.9, 36.9 and 34.1 bu. per ac., respectively. In similar trials in which 0.2, 0.4 and 0.8 lb. 2,4-D per ac. were applied in oil and water carrier volumes of 1, 2, 4 and 8 gal. per ac., respective average yields for the different carrier volumes were : 34.6, 36.7, 37.7 and 37.7 bu. per ac. Other data indicated that 0.4 lb. 2,4-D per ac. applied in 3.75 gal. per ac. was about as toxic to spring wheat as 1 lb. 2,4-D per ac. applied in 15 gal. carrier. In trials during 1951, but not during 1950, 0.4 lb. 2,4-D per ac. in oil was more toxic than 0.8 lb. 2,4-D per ac. in a water carrier. Applications were made when the wheat was 7 in. high and had tillered. It was considered that a combination of relatively low temperatures, with low volume applications of 2,4-D, were probably the primary causes of cases of sterility in spring wheat.—P.J.B.

## BUCKWHEAT

37 ANKER LADEFOGED, A. V. **Cultivation of buckwheat on up-country patanas.** *Trop. Agriculturist* 1952, **108,** No. 4, 269-70, illus. [Bopatalawa Cattle Fm, Ceylon]

Trials were made with buckwheat (*Fagopyrum sagittatum*) introduced from Denmark, as a pioneer crop on the upland patanas (high grass tropical savannah dominated by coarse grasses such as *Imperata cylindrica*) of Ceylon. Buckwheat sown in November, 1951, produced a green crop suitable for cattle-feeding within 2.5 months of sowing. The average yield of grain was 1200 lb. per ac. Buckwheat was found to tolerate acid soils but benefited from lime dressings of 0.5 ton every 2 years. Sowing rates of 50-60 lb. per ac. for a green crop and 70 lb. per ac. for a grain crop and manurial applications of 1 cwt. basic slag, 0.5 cwt. cyanamide and 0.5 cwt. potassium chloride are recommended for pioneer crops of buckwheat. The following rotation is now being used at Bopatalawa with the object of establishing improved pasture grasses on the patanas : (a) buckwheat, (b) lupin/sunflower mixture, (c) radishes for fodder, (d) buckwheat (sown at half the seed rate already mentioned) as a nurse crop for pasture grasses.—W.J.B.

## OATS

38 HOLMGREN, O. Svalöfs Guldregnshavre III (K 01452). [**Svalöf's Golden Rain III oats (K 01452).**] *Sverig. Utsädesfören. Tidskr.* 1953, **63,** No. 3, 205-9.

Notes are given on the origin of Guldregn III [Golden Rain III] oats and its performance in comparative trials during 1934-52. In trials at the Kalmar Branch of the Swedish Seed Association, during the entire trial period Golden Rain III yielded an average of 3.7% more grain than Golden Rain II. This yield superiority was evident in 16 of 19 trial years. In a second series of trials over the same period at a number of locations, Golden Rain III outyielded Golden Rain II by 1.4%, though at one location on Öland the difference was 11.1% (during 1940-9). In further regional trials, mostly during 1938-44, Golden Rain III was markedly superior to Golden Rain II only in the south Kalmar and Gotland district, where its yield superiority averaged 4.3 and 5.2%, respectively. Golden Rain III is one unit better than Golden Rain II in straw stiffness as measured on a scale 1 to 10.—P.J.B.

39 Northern Ireland. Ministry of Agriculture. **Oat variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1953, **27,** No. 10, 299-300.

Two series of variety trials, one on fertile soils and the other on poor hill soils, were carried out in all counties in the years 1950-2. On fertile soils, the varieties Glasnevin Triumph and Sun II (Steel) gave the highest average grain yields of 21.9 and 21.4 cwt. per ac., respectively, and held the first and second positions in all 3 years. The other varieties tested were S. 84, Stormont Grandee, Stormont Arrow, Crown and Stormont Iris. Of these S. 84 gave the highest average yield of grain, 20.7 cwt. per ac. In County Fermanagh, where the results differed notably from those in other counties, S. 84 gave the highest average yield of grain, 23.6 cwt. per ac. On poor hill soils, Stormont Kern gave a higher average yield of grain (15 cwt. per ac.) and straw than the other varieties tested, Stormont Grandee, Ayr Line (Potato), Utility (Potato) and Ayr Bounty.—W.J.B.

40 Northern Ireland. Ministry of Agriculture. **Reports from the counties. Oat variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* **28,** No. 5, 140-2.

The trials were carried out in the years 1950-3 on farms in County Down. Among varieties suitable for soils of medium to high fertility Glasnevin Triumph gave the highest average yield of both grain and straw. Svalöf Blenda, which was included in the trials for the first time in 1953, gave higher yields of grain than Glasnevin Triumph on the average of two tests. Under conditions of very high fertility, Svalöf Blenda, Abed Minor and Sun II (Steel) were much more resistant to lodging than Glasnevin Triumph. Among the varieties tested on poor soils Stormont Kern and Utility gave the highest, and Richland Iowa 105 the lowest, yields of grain.—W.J.B.

41 Canada Department of Agriculture. Associate Committee on Plant Breeding. **Report on co-operative tests of oat varieties 1952.** 1953, pp. 25.

The tests reported were carried out with 20 varieties at 17 locations. Yields during 1952 were headed by Ajax, with 102.1 bu. per ac., followed by Exeter, Abegweit and Victory, with 101.6, 99.6 and 97.8 bu. per ac., respectively. Data are also given of other agronomic characters tested. Average yields over the period 1949-52 on the black soils of Manitoba and Saskatchewan were headed by Ajax, 85.7 bu. and Exeter, 79.7 bu. per ac. On the brown soils of Saskatchewan and Alberta, yields were headed by Exeter, 63.8 bu. and Victory, 59.1 bu. per ac. On the black soils of Alberta and Stations in Ontario and British Columbia, yields were headed by Exeter, 130.4 bu. and Victory, 123.3 bu. per ac.—P.J.B.

42 Rosen, H. R. and others. **Arkwin, a disease-resistant oat and comparisons of small grains as winter forage.** *Bull. 533. Arkansas agric. Exp. Sta.* 1953, pp. 31, bibl. 8, illus.

Arkwin is a selection from a Tennessee 1922 × Bond-Iogold cross. It is a red oat (*Avena byzantina*), combining great winterhardiness in Arkansas, with resistance to a wide range of races of crown rust, stem rust and smut and to Helminthosporium blight and virus diseases. In winterhardiness, it equals Forkedeer and Fulwin, two of the hardiest varieties in Arkansas conditions. Arkwin is particularly well adapted for winter grazing owing to its erect growth-habit and the rapidity with which it produces early growth. Grain yields are satisfactory in most parts of Arkansas. Notes on the botanical and agronomic characters of Arkwin and general recommendations for its use in Arkansas are given. —P.J.B.

43 Kudrjavceva, N. N. [**New regionalized varieties of oat.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 3, 67. [State Comm. Var. Trials, Grain, Oil Crops, Herb. Pl.]

The two varieties of *Avena sativa* described are Nadežnyĭ (for the Minsk Province) and Iygeva Hjamarik (for the Estonian SSR).—M.H.

44† Kauter, A. and Huber, W. Welche Hafersorte eignet sich am besten für den Anbau als Grüngetreide, insbesondere als Bestandteil von Nachfruchtgemengen? [**What type of oat is best suited for cultivation as fodder, particularly as a constituent of after-crop mixtures**?] [Reprint] *Die Grüne* 1953, **27,** No. 29, pp. 11. [Zürich-Oerlikon]

In admixture with summer vetches and peas, 18 different oat varieties were planted during 1948-50 to determine what varieties would give the best yields as green fodder. Weights of green fodder, dry-matter and crude-protein contents and the intensity of frit-fly incidence are tabulated. The varieties, Flämingstreue, Flämingsgold and Soldanella satisfied the conditions required for an oat variety used in admixture with legumes; namely, quick growth, early maturity, high yields and low frit-fly incidence.—M.A.

45 PHILIPP, Lieselotte. Ein Beitrag zur Morphologie der Wurzel von *Avena sativa* L. [**A contribution to the study of the morphology of the root of *Avena sativa*.**] *Z. Acker- u. Pflbau* 1953, **97,** No. 1, 71-100, bibl. 74, illus.

46 GARDNER, H. W. **Nitrogen top dressing of spring oats.** *Agriculture, Lond.* 1953, **60,** No. 7, 328-34. [Herts. Inst. Agric., St. Albans]

Trials were carried out on farms in Hertfordshire in 1949-52 to measure the effect of early (May) and late (June) dressings of nitrogen on the yield and protein content of the grain. N was applied in standard doses of 2 cwt. nitrochalk per ac. to randomized sub-plots of variety strips. The yields of the different varieties used were compared. None of the varieties tried, except S.221 (Maldwyn), which was used in 1950 and 1952 only, outyielded Victory. Eagle, Onward, Sun II and Victory were about equal in yield. Yielder gave the lowest average yield, 18.5 cwt. per ac. On the average, May dressings with N (the response to which varied markedly according to centre and year) gave an increase in yield of 1.26 cwt. per ac. This response is thought insufficient to justify the general recommendation of May top-dressings of N, although under certain soil conditions the response may be profitable. June dressings with N gave no further increase in yield. The May dressing gave an increase of 2 cwt. per ac. in weight of straw recovered. The average protein content of the grain increased by 1.12% as a result of the May dressing and by a further 1.21% as a result of the June dressing. The differences between the protein contents of grain of different varieties were small while the differences between those of grain grown at different centres were marked. The response of the protein content of the grain to applications of N was greatest at those centres where the protein content of the grain on untreated plots was lowest. The average protein content of the straw was 2.75% on untreated plots and 3.6% on plots receiving both May and June dressings.—W.J.B.

47 LEHR, J. J. **Exploratory pot experiments on sensitiveness of different crops to sodium: B. Oats.** *Pl. and Soil* 1953, **4,** No. 4, 289-97, bibl. 18, illus. [Pl. Nutr. Res. Lab., Wageningen, Neth.]

Oats were grown in pots in 2 series of trials. In the first, a quartz sand/dusarit mixture was used, and, in the second, a humic sandy soil. Applications of nitrate of soda and of calcium nitrate were made to the oats, each combined with different levels of K treatment, in order to study the specific effect of Na on the crop. On the Na-free, sand/dusarit soil, a positive yield increase of grain and straw in response to Na treatment was obtained at all levels of K treatment; on the sandy soil, a specific Na effect was noted only where K was omitted from the treatments. The sandy soil had a moderate K and a high Na content. It was concluded from these experiments that Na exercises an independent function in the oat plant, rather than merely a K-replacing effect, and that the presence of Na is required to obtain optimum oat yields. A review is given of the literature of pot experiments with Na treatments applied to oats.—P.J.B.

48 WEHUNT, R. L. and COLLINS, W. O. **Response of oats to Na and K on Norfolk sandy loam at two residual K levels.** *Soil. Sci.* 1953, **76,** No. 1, 91-6 bibl. 9. [Univ. Georgia, Athens]

Trials in Georgia during 1949-51 are reported on the effect of the following manurial treatments: (a) no Na or K, (b) Na equivalent to 120 lb. $K_2O$ per ac., (c) K equivalent to 120 lb. $K_2O$ per ac., (d) 2 parts Na + 1 part K equivalent to 60 lb. $K_2O$ per ac. and (e) 1 part Na + 2 parts K equivalent to 60 lb. $K_2O$ per ac. The oats were grown on 2 soils, one containing a high and the other a low residual content of K (64 and 23 lb. exchangeable K per ac.). Mean oat forage yields on the soil with low residual K content were 1826, 2784, 3289, 3249 and 3360 lb. oven-dry material per ac. for treatments (a), (b), (c), (d) and (e), respectively. On the soil with a high content of exchangeable K, respective yields were 2229, 3362, 3408, 3363 and 3466 lb. per ac. Additions of Na to the soil markedly increased the Na content of the plants. More Na was found in plants from plots with soil containing low than plants grown on soil with a high content of residual K. It was concluded that Na has a beneficial effect in the nutrition of oats, this effect being greater on soils with a high than those with a low content of residual K.—P.J.B.

49 SORTEBERG, A. Noen samspillseffekter ved planteproduksjon sett i relasjon til kjemiske avlingsanalyser. [**Some interaction effects in crop production viewed in relation to chemical analyses of the crop.**] *Meld. Norg. LandbrHøisk.* 1953, **33**, No. 2, 162-70, bibl. 2, English summary p. 170. [Inst. Fert. and Soil Mgmt, Agric. Coll., Norway, Aas]

In pot trials with oats and barley, in which different amounts of Ca, N, P and K were applied as manures, there were considerable positive interactions between N and P and between P and K, in terms of grain and straw yields. P treatments reduced the N and K content of the dry matter. Observations are made on the causes of these interactions.—P.J.B.

## BARLEY

50 ROTTERDAM. European Brewery Convention. **Report of the Barley Committee trials 1951.** 1953, pp. 73.

The spring barley varieties Carlsberg, Earl, Gold, Haisa and Herta were compared with the variety Kenia in replicated randomized-block experiments in each of 8 countries, namely : Belgium, United Kingdom, France, Holland, Ireland, Norway, Sweden and Switzerland. In different countries a number of varieties, other than the 6 mentioned above, were included. Results from Denmark and Finland were not included in the official yield statistics. In spite of generally bad weather and late sowing, the differences between varieties were remarkably consistent in the different countries. In yield, Kenia, Earl and Haisa were close together while Carlsberg and Herta each yielded about 14% more. Carlsberg was outstanding in its low N content, high thousand-grain weight and high yield of brewers' extract, but was found susceptible to loose smut. Herta showed outstanding straw-stiffness but germinated irregularly and modified indifferently in the malting process. It was concluded that Carlsberg in 1951 again gave the best results.—M.A.

51 BUCHLI, M. Die Wintergerstensorten des schweizerischen Richtsortimentes für den Getreidebau 1953. [**Recommended Swiss winter barley varieties for 1953 planting.**] *Mitt. Schweiz. Landw.* 1953, **1,** No. 9, 140-4, illus.

The characteristics of the 4 winter barley varieties, Riniker, Argovia M, Salemer (6-row) and Gembloux 456, recommended for 1953 planting, are briefly given.—M.A.

52 ATKINS, I. M. **Cordova barley.** *Bull. 760. Texas agric. Exp. Sta.* 1953, pp. 9, illus.

Cordova was produced from a Texan × Wintex cross and is adapted to the Rolling Plains and Central Texas. In trials during 1947-52 at 8 locations, autumn-sown Cordova yielded an average of 40.7 bu. per ac., compared with 35.9 for Texan, 33.9 for Wintex and 36.5 for Tenkow. Cordova has a high test-weight, is early-maturing, stands well for combine-harvesting and is resistant to some races of mildew and loose smut, but is susceptible to most of the leaf diseases of barley. It is well adapted for use as a winter grazing crop.—P.J.B.

53 HUNT, J. L. **The effect of various rates of application of 2,4-D amine salt and MCPA sodium salt on cereals.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain 1953* pp. 5. [Shell Chem. Co., Ltd., Gt Britain]

The results are given of trials at 23 locations in 1953, in which applications of MCPA Na salt at 12 and 24 oz. acid equivalent per ac. and 2,4-D amine salt at 7.5 and 10 oz. acid equivalent per ac. were made to well-tillered barley, 10-15 in. high. The herbicides were applied in spray volumes of 50 gal. per ac. Weed populations were moderate to heavy and consisted of annuals and perennials. Data are given of weed assessments during the growing season and after cereal harvest for a number of weed species following the different treatments. Overall differences in weed control between different treatments were slight and weed control was regarded as satisfactory in all cases. High rates of treatment, particularly in the case of MCPA, gave slightly better weed control than low rates. MCPA appeared to be slightly better than 2,4-D in controlling *Raphanus raphanistrum*, *Polygonum aviculare* and *Veronica* spp., but inferior in the case of *Chenopodium album*. Differences in cereal yields did not reflect differences in weed control, owing to the generally wet season.—P.J.B.

54 TYNER, L. E. **The control of loose smut of barley and wheat by Spergon and by soaking in water at room temperature.** *Phytopathology* 1953, **43,** No. 6, 313-16, bibl. 3. [Bot. and Pl. Path. Div., Sci. Serv., Dep. Agric., Ottawa]

Loose smut (*Ustilago nuda*) in a number of barley varieties was satisfactorily controlled by the following treatments made at temperatures ranging from 72 to 77°F. : seed soaked in water for 56-64 hr. ; seed soaked in water for 6, 8 or 10 hr., followed by soaking for 40, 44 and 48 hr. in a 0.2% suspension of Spergon ; seed soaked in a 0.2% suspension of Spergon, with no pre-soaking treatment. The addition of Spergon to the soaking water, as in the first-mentioned treatment, reduced bacterial activity in the soaking water. In similar temperature conditions, loose smut of wheat (*Ustilago tritici*) was controlled by either soaking the seed in water for 48 hr., or by soaking in a 0.1% suspension of Spergon for 24 hr. Seed mortality was severe in the latter treatment.—From author's summary.

55 RISCH, N. A. Reação de algumas variedades de cevada a três patógenos : *Erysiphe graminis hordei*, *Puccinia graminis hordei* e *Ustilago hordei*. [**Reaction of barley varieties to three pathogens *E. graminis hordei*, *P. graminis hordei* and *U. hordei*.**] *Rev. agron. Porto Alegre* 1953, **16,** No. 193-8, 2-9, bibl. 16, English summary p. 8.

Varieties of barley were artificially inoculated with the causative organisms of powdery mildew

(*Erysiphe graminis*), black rust (*Puccinia graminis hordei*) and covered smut (*Ustilago hordei*), and the degree of resistance of the different varieties to the diseases was recorded. The results are tabulated.—W.J.B.

56 BENSON, N. R. **Effect of season, phosphate, and acidity on plant growth in arsenic-toxic soils.** *Soil Sci.* 1953, **76,** No. 3, 215-24, bibl. 21. [Washington Agric. Exp. Sta., Pullman]

The results are reported of pot and field trials with barley. Barley grown in the greenhouse in sand cultures containing a constant ratio of 2 or 10 moles of phosphate per mole of arsenate, showed little growth retardation following the application of large amounts of lead arsenate to the cultures. Soluble arsenic was about equally toxic in summer and winter and was not greatly affected in this respect by applied P. On some soils, given soil contents of arsenic were non-toxic in winter, but toxic in summer; on other soils, toxicity was evident both in summer and winter. On soils with pH values less than 6, P treatments made to the soil greatly increased dry-weight yields of barley plants grown on toxic soils; where pH values were greater than 6, this effect of P was not evident. Barley responded to P applications when grown in the greenhouse on toxic soils, but showed little response to P in the field.—P.J.B.

57 FRIESEN, G. and OLSON, P. J. **The effect of 2,4-D on the developmental processes in barley and oats.** *Canad. J. agric. Sci.* 1953, **33**, No. 4, 315-29, bibl 9, illus. [Univ. Manitoba, Winnipeg]

Pot studies were made on the relation between yield and morphological response of barley and oat plants and the time of treatment with 2,4-D. Barley plants were treated with 2,4-D isopropyl ester and oat plants with 2,4-D butyl ester at 1- or 2-day intervals from emergence to the time of heading. Rates of treatment were 12 oz. 2,4-D acid equivalent in 120 gal. water per ac. In barley, treatments given 1-4 days after emergence resulted in leaf deformities on nearly all main culms; treatments made 5-9 days after emergence caused spikelet deformities on main culms. Spike differentiation became visible at 8 days after emergence. At this stage, leaf deformities became evident on the tillers, coinciding with the disappearance of these effects on the main culms. Tillers began to show spike deformities when treated 9 days after emergence. Treatments made during the period 12-14 days before heading up to just before spike emergence resulted in a high degree of sterility. This stage was associated with differentiation of the reproductive parts. The tillers treated at this time remained normal. During the period from 2 days before heading to the final treatment date (16 days past heading), treatments caused a high degree of sterility in the tillers, without affecting the main culms. Oat plants treated 1-15 days after emergence showed leaf and vegetative deformities. At this stage the growing point had only leaf initials. The tillers of plants sprayed 5-26 days after emergence showed vegetative deformities. Panicle deformities were caused in the main culms of plants treated between 14 and 23 days after emergence; in the tillers, such deformities were caused in plants treated 17-36 days after emergence. Treatments made between the period when the plants were 18 in. high, with 5 leaves, until 3 days before heading, caused sterility in main culms, approaching 50% at the maximum. Treatments from 13 days before heading to 4 days after heading of the main culm, caused a high degree of sterility in the tillers. The incidence of abnormalities in oats corresponded with that in barley, though deformities in oats were caused over a longer period of time. Anther differentiation in oats, however, began much earlier in relation to differentiation of the inflorescence, than in barley. Pistil differentiation occurred relatively later in oats than in barley. These facts are regarded as sufficient to explain the differences between oats and barley with regard to the growth period at which 2,4-D sprays cause the greatest yield reductions in the field. Pot and field trials on the effect of 2,4-D treatments on oat yields gave somewhat conflicting results. Yield reductions following treatments at the time of production of leaf initials were serious in pot trials, but not in field trials. These differences may have been due to the relatively greater succulence of greenhouse plants, the fact that a 12 oz. treatment, as compared with 8 oz. in the field, was used and that tiller production was more spaced out in time in the field than in the greenhouse.—P.J.B.

58 YAMAMOTO, T. **Studies on sterility in barley. 2. On the relation between sterility and the residual winter habit with special reference to translocation efficiency.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 260-2, illus., English summary p. 262. [Hokkaido Nat. Agric. Exp. Sta.]

The sterility occurring in incompletely vernalized winter barley sown in spring was investigated. Winter barley chilled at 1°C. for 30 days or more and sown in spring flowered and yielded grain normally. As the length of the vernalization treatment was reduced over the range 30 to 20 days, the incidence of sterility became progressively higher. With a chilling period of less than 20 days the plants sown in spring failed to form ears and remained in a vegetative stage throughout the season. When the growth rates of plants, raised from seed, vernalized for 20 and 40 days, respectively, were compared, it was found that the productive organs of the latter developed earlier ıd faster than those of the former. The trans- cation efficiency (indicating the degree to which aterial is drawn from vegetative organs to be sed in the formation of reproductive organs) was 5% and 4% in the case of plants from seeds ıbjected to 40 and 20 days treatment, respectively. ulm/leaf ratios were recorded for both treatments. oth the translocation efficiency and the culm/leaf tio of the barley plants decreased in proportion the intensity of the residual winter habit which itself an indication of the degree of incomplete- ess of the vernalization process.—W.J.B.

9 ARLAND, A. Bodenuntersuchung auf neuem Wege. [**A new approach to soil investigation.**] *Deutsch. Export* [n.d.], 6-14, illus. [Deutsch. Akad. Landw., Berlin]

method is described for determining the nutrient quirements of crop plants by measuring the fect of different fertilizers on the relative tran- iration of such plants. Winter barley plants were moved from the field at the 4-leaf stage, the roots ere detached from the root-neck and the root- eck dipped into paraffin wax which had been elted at 60°C., the level of immersion of the lants in the wax corresponding with their actual round level in the field. The plants were then stood wire supports and wilting was allowed to pro- eed for 30 min. By deducting the weight of the lant after wilting from the weight of the plant nmediately after its insertion in wax, an absolute anspiration value was obtained. Correction, for etermining the relative transpiration, was made y deducting from both weighings, the weight of ie root-neck below ground level. The theory is dvanced that the healthiest plants are those which ake the best possible use of soil water and that n incorrect application of fertilizers upsets the lant water metabolism by increasing the relative anspiration. The effect of applications of potas- um and magnesium salts on the relative transpira- on of winter barley plants is graphically illustrated nd indicates what levels of manuring are required y the plant in respect of these two elements under ifferent soil conditions.—M.A.

## IAIZE

0 MANN, H. H. **New crops** [**maize**]. *Rep. Rothamst. exp. Sta. 1952* Harpenden, 1953, 152-3. [Woburn Exp. Sta.]

ver the period 1949-51 an annual yield of dry rain exceeding 30 cwt. per ac. was obtained from arly varieties of hybrid maize obtained from the SA. In 1952, the hybrid Wisconsin 275 gave 2% ripe ears and yielded 50 cwt. per ac. of dry rain after being sown on 1 May and finally reaped n 10 October. Wisconsin 240, planted on the ame date, yielded 38 cwt. per ac. All varieties were manured with 3 cwt. nitrochalk per ac. Postponing the sowing date from 1 May to 16 May reduced the yield by 6 cwt. per ac. in the case of Wisconsin 240 and by 12 cwt. per ac. in the case of Wisconsin 275.—W.J.B.

61 BLAND, B. F. **Maize as a silage crop in eastern England.** *Agriculture, Lond.* 1953, **60,** No. 7, 311-14, bibl. 3. [Norfolk Agric. Sta.]

Since the soluble carbohydrates present in the cobs are essential for the successful ensiling of maize, early-maturing varieties of maize should be grown for silage in England so as to obtain the maximum number of mature and partially mature cobs at cutting time. As a result of trials conducted in Norfolk in 1947-50 with early-maturing hybrids and other maize varieties to determine which varieties were most suitable for silage purposes, the following groups of varieties are listed in order of early maturity and an indication given of the number of days taken on the average by the cobs of each group to reach the cheesy stage : (a) Canbred 150 and Wisconsin 240 (130 days), (b) Wisconsin 255, Wisconsin 355, Funks G35 and Jaune Gros de Domaine (137 days), (c) Wisconsin 275 and De Kalb 43 (140 days), (d) Wisconsin 531, Pioneer 359 (153-156 days), (e) White Horse Tooth (no cobs set). Groups (d) and (e) are considered too late in maturing for silage purposes. In general, the yields of green material were closely correlated with plant populations, but optimum plant populations (30,000 plants per ac.) were not obtained, owing largely to the depredations of rooks. The highest plant populations, ranging from about 17 to 24 thousand, were obtained in 1949. In that year Wisconsin 355 with a plant population of 24,100 yielded 16 tons per ac. of green material containing 3.7 tons of dry matter and 6.36 cwt. of crude protein. This yield is taken as a measure of the capacity of maize as a crop for silage in eastern England, when a reasonable plant population is obtained. A comparison is made between the yield of Wisconsin 355 in 1949 and the average yields of kale, roots and oats/vetch mixtures in England. Such a maize crop would yield more dry matter but less protein per ac. than an average crop of kale and more dry matter than an average crop of mangels or oats/vetch mixtures. A row width of 24 in. with plants 9-10 in. apart is considered likely to be the optimum spacing for maize grown for silage.—W.J.B.

62 CAPUTA, J. Essais de culture á diverses densités de peuplement des variétés de mais hybride Wisconsin 255 et Wisconsin 270, en 1952. [**Sowing density trials with the maize hybrids Wisconsin 255 and Wisconsin 270, in 1952.**] *Rapp. Sta. féd. d'Essais agric. Mont-Calme, Montagibert, Lausanne et Pully. 1952* Berne, 1953, Pt. 2, 925-8 bibl. 8.

An experiment carried out at Beau-Cèdre (Jouxtens, 510 m.a.s.l.) in 1952 to examine optimum sowing densities of Wisconsin 255 and Wisconsin 270 maize, showed that both varieties gave higher yields as the sowing density increased from 4-6 plants to 10 plants per sq. m. but that the protein content of the grain did not increase correspondingly. A plant density of 6-8 per sq. m. is recommended for both varieties.—M.A.

63 Nyasaland Agricultural Quarterly Journal. **Maize.** *Nyasald agric. quart. J.* 1951, **10,** No. 4, 97-101.

A series of experiments was conducted on maize at a number of stations throughout Nyasaland to compare varieties, fertilizers and spacing. The hybrid varieties from Southern Rhodesia gave the highest yields. Applications of ammonium sulphate at rates of 100 lb. per acre increased crop yields significantly. The spacing generally recommended for maize is 3 ft. × 3 ft. with 3 plants per hole. A cultivation experiment at Lilongwe showed that ridging up after the rains had fallen gave increased yields of 2 bags per acre [1 bag = 200 lb.] compared with ridging up before the rains.—M.A.

64 Cartmill, W. J. **Maize fertilizer and rotation trials on the Atherton Tableland.** *Qd agric. J.* 1953, **76,** Pt. 5, 249-63, illus.

A series of fertilizer trials laid down from 1947-50 in the Atherton Tableland district showed that, in forest soils, nitrogen increased crop yields and that phosphates were also beneficial in all but exceptionally wet weather. From 1947-50, maize following groundnuts in a groundnut/maize rotation trial yielded substantially more than maize following maize, the increases ranging from 25-40%. —M.A.

65 Simonett, D. S. and Drane, N.T. **Climate and maize yields on the Atherton Tableland.** *J. roy. Soc. N.S.W.* 1953, **86,** Pt. 2, 22-31, bibl. 6, illus.

Maize yields on the Atherton Tableland in north Queensland are significantly depressed by rainfalls exceeding 22 in. in the growing season of December-February (including the tasselling period), each additional inch reducing yields by approximately 0.402 bu. per acre. Rainfalls above 5 in. during cob-development in March-April also reduce yields, each inch by 0.438 bu. per acre. During the period 1913-14 to 1948-9 maize yields declined to a slight but significant degree and present-day totals are at least five bu. per ac. below those of the early years. The factors responsible for the time-yields decline, and the factors associated with rainfall which appear to be responsible for the rainfall-yield suppression were discussed. The statistical technique used was that of confluence analysis.—Authors' summary.

66 Kerle, W. D. **Maize hybrids and varieties.** *Agric. Gaz. N.S.W.* 1953, **64,** Pt. 5, 239-40, 270-1.

A description is given of 4 late-maturing and 8 early-maturing maize hybrids. Maize recommended for sowing in different districts of New South Wales includes hybrid strains and open-pollinated varieties for grain production and for fodder and silage.—M.A.

67 Ward, C. B. and Tischer, R. G. **Use of cobaltous chloride to detect moisture patterns in partially dehydrated kernels of corn.** *Cereal Chem.* 1953, **30,** No. 5, 420-6, bibl. 5. [Iowa Agric. Exp. Sta., Ames]

Studies are reported on the use of cobalt chloride-methyl alcohol solution to determine the distribution of moisture in maize grains with moisture contents ranging from 0.5 to 70%. The results showed that this method would not indicate the presence of moisture where the grains contained less than 4% moisture.—P.J.B.

68 Altona, R. E. and Mentz, N. J. **Weed control in maize-lands with weedkillers.** *S. Afr. J. Sci.* 1953, **49,** No. 11, 340-3, bibl. 5.

Experiments were carried out at Frankenwald and Bethlehem from 1949-51 to investigate the combination of weedkillers and cultivation, with the object of assessing the beneficial effects of spraying maize-lands with selective herbicides. A pre-emergence spray of 2,4-D or MCPA at 1 lb. acid equivalent per acre controlled weeds, including annual grasses and 'uintjies' (*Cyperus* spp.) for approximately one month. After this, one, or a maximum of two, cultivations were all that appeared necessary to obtain a good crop yield. The amine salt of 2,4-D is recommended as being safe and efficient.—M.A.

69 Altona, R. E. **Experiments with fertilizers and weedkillers on maize at Frankenwald in 1951-52.** *Rep. Frankenwald Fld Res. Sta. 1952* 35-43, illus. [Received 1953]

[See also *Fld Crop Abstr.* 4 : 219, 1150.] Experiments were carried out on : (1) the effect on maize yields of cultivation and applications of various weedkillers after planting ; (2) the effect on maize yields of applications of various weedkillers at planting time ; (3) the effect of pre-emergence weedkiller treatments on germination and yield of 12 maize varieties ; (4) the effect of weeds on the root systems of maize plants. Experiment 1 showed that although the control plot (with clean cultivation and without herbicidal treatment) gave the highest maize yields, there was no significant difference between yields from the control plot and those plots cultivated once and treated with the sodium, amine and ester salts of 2,4-D and Agroxone. A second cultivation on these plots did not increase yields. Experiment 2 showed no significant difference in the yields of maize treated with (a) 0.75 lb. or 1.0 lb. of the amine or ester forms of 2,4-D and Agroxone at planting time and (b) 1.0 lb. amine or ester form of 2,4-D and Agroxone 5 days after planting. Data obtained over 3 seasons suggest that spraying with herbicides at sowing is fairly safe, provided that heavy rain does not fall shortly afterwards. Results from Experiment 3 indicated that of the 12 varieties tested, namely Natal 8-Row, Anveld, Bushman, Early Pearl, Hickory King, Potchefstroom Pearl, American White Flint, Wisconsin, Sahara, Cincinatti Bushman, Kroonstad Robyn and Silver King Rooi Stronk, only Silver King Rooi Stronk showed any reduction in maize yield due to the herbicidal treatment. There was no significant difference in yields due to the herbicidal treatment of any other maize variety. No ill effects on germination due to the herbicide were observed in any variety. Experiment 4 showed that maize plants which were kept completely free from weeds from germination to full maturity, attained a height of 6 ft. at tasselling with a root growth of over 3 ft. Maize plants which were given no weed control throughout the growing period reached a height of only 3 ft. at tasselling and had a root growth of less than 2 ft.—K.L.

70 STANTON, W. R. and CAMMACK, R. H. **Resistance to the maize rust, *Puccinia polysora* Underw.** *Nature, Lond.* 1953, **172,** No. 4376, 505-6, bibl. 6. [W. Afr. Rust Res. Unit, Moor Plantation, Ibadan, Nigeria]

[See also *Fld Crop Abstr.* 5 : 1108.] A study has been made of maize varieties from different sources to discover a rust-resistant type. No resistance was found in the tested material from East, West and South Africa, India, Ceylon, or Malaya ; the types from USA showed variable resistance, but those from Mexico, the Caribbean and Venezuela included tolerant or highly resistant material. It is maintained that the source of the resistant types is interesting in that its location provides support for Vavilov's theory of the centre of origin of cultivated plants, and of their associated pathogens which have evolved with them. [See *Fld Crop Abstr.* 5 : 661.] Of the imported material tested, 5 varieties from Mexico show promise of being suitable as sources of resistance for the synthesis of types adapted to West African conditions.—M.H.

71 NYASALAND FARMER AND FORESTER. **A preliminary note on a new rust of maize (*Puccinia polysora*) in Nyasaland.** *Nyasald Fmr and Forester* 1953, **1**, No. 2, 48-50.

72 BIGGER, J. H. and PETTY, H. B. **Reduction of corn borer numbers from October to June. A ten-year study.** *Bull. 566. Illinois agric. Exp. Sta.* 1953, pp. 15.

The studies reported showed that under Illinois conditions, effective reduction of over-wintering populations of the European corn borer (*Pyrausta nubilalis*) could be secured by : heavy grazing of the stover after harvest ; keeping maize-picker rolls tight during harvest, and using ploughs to bury the stalks thoroughly when carrying out subsequent spring cultivations.—P.J.B.

73 TONINI, G. L'attività fotosintetica in alcuni tipi di granoturco. [**The photosynthetic activity in some maize varieties.**] *Ital. agric.* 1953, **90,** No. 9, 649-55, illus.

This is a study of the photosynthetic activity in relation to emergence, growth and life of the leaves in the maize varieties Quarantino, Cinquantino, Marano and Pfister. These 4 varieties cover an increasing range in height and length of vegetative cycle, the first-named being dwarf with a vegetative cycle of 46 days from plant emergence to the emission of the last leaf, while the last-named is very tall and has a vegetative cycle of 75 days. The period of greatest photosynthetic activity is during the 25-30 days after the emergence of the last leaf, when the plants form more than 50% of their total dry matter.—E.B.O

74 PANELLA, A. Esperienze sul consumo idrico di alcuni mais ibridi americani in confronto col Nostrale Umbro. [**Trials on the water consumption of some American maize hybrids compared with Nostrale Umbro.**] *Ital. agric.* 1953, **90,** No. 8, 524-6. [Ist. Agron. Univ. Perugia, Italy]

75 MCLANE, S. R. and MURNEEK, A. E. **The detection of syngamin, an indigenous plant hormone, by culture of immature corn [maize] embryos.** *Res. Bull. 496. Missouri agric. Exp. Sta.* 1952, pp. 91, bibl. 180, illus.

76 FAIRCHILD, R. S. **Comparative development of the embryos of inbred and hybrid maize.** *Iowa State Coll. J. Sci.* 1953, **27,** No. 3, bibl. 15, illus. [Iowa Agric. Exp. Sta., Ames]

Studies are reported on the expression of heterosis in the morphological and histological development of different parts of the maize embryo.—P.J.B.

77 WAGGONER, P. E. and SHAW, R. H. **Stem and root temperatures.** *Phytopathology* 1953, **43,** No. 6, 317-18, bibl. 6. [Iowa Agric. Exp. Sta., Ames]

Studies are reported on the temperatures within the stems and roots of maize and tomato plants growing in the field, as compared with the temperatures of the adjacent air, or soil. The findings are discussed in relation to their bearing on disease incidence.—P.J.B.

78 FERWERDA, F. P. **Methods to synchronize the flowering time of the components in crossing plots for the production of hybrid seed corn.** *Euphytica* 1953, **2,** No. 2, 127-34, bibl.10. [Pl. Breed. Inst., Wageningen, Netherlands]

Methods of synchronizing the flowering of hybrid maize parent plants are reviewed. The most practicable method was considered to be the retardation of the development of the earlier parent, preferably the pollen parent. Comparisons of the temperature-sum requirement over the period from sowing to tasselling and the number of days required to complete the same period, showed that the temperature-sum value was a more constant value than the number of days. It was considered that plans for synchronizing flowering in hybrid maize parents would be better based on temperature-sum values, as an indication of how to space out sowings, than on calculations based on the number of days required from sowing to tasselling.—P.J.B.

79 KOEHLER, F. E. and ALBRECHT, W. A. **Biosynthesis of amino acids according to soil fertility. 3. Bioassays of forage and grain fertilized with " trace " elements.** *Pl. and Soil* 1953, **4,** No. 4, 336-44, bibl. 8. [Missouri Agric. Exp. Sta., Columbia]

Maize was grown on a silt-loam soil receiving each of 7 different combinations of the 5 major elements (N, P, K, Ca and Mg), combined with each of 3 rates of a trace-element mixture. The trace-element mixture contained Mn, Cu, B, Zn and Co and the 3 rates of treatment were nil, 100 and 300 lb. per ac. Tests were made of the hardness of the maize grain, the preference of rabbits for the grain from plots and the content of 10 essential amino acids in the grain. There was least variation in grain hardness among samples from plots receiving the major element treatments, with no trace-element supplements. The addition of trace-element supplements resulted in considerable variation in grain hardness in samples from plots receiving the different major-element treatments. The highest consumption of grain by rabbits occurred where the samples came from plots receiving no trace-element treatments, while the greatest preference by rabbits was for grain from plots receiving 300 lb. trace-element mixture per ac. In terms of nutritional efficiency, samples taken from plots receiving dolomitic limestone were markedly superior in this respect to samples from plots receiving the other major-element treatments (N, P, K, and Ca). Per g. of live-weight gain, 5.48 g. of grain was required from plots manured with dolomitic lime, followed by 5.72 g. for grain from plots receiving trace-element treatments only. In the case of grain from untreated plots and that from plots receiving complete major- plus trace-element treatment, 7.97 and 13.67 g. of grain per g. of live-weight gain were required, respectively.—P.J.B.

## SWEET CORN

80 HASKELL, G. **Harvesting hybrid and inbred sweet-corn seed in England.** *J. Sci. Food Agric.* 1953, **4,** 433-9, bibl. 8.

Sweet corn is increasingly grown for seed in England. As the seeds are unusually susceptible to fungal diseases, especially if left too long in the ear, correct harvesting of the different varieties is essential. Optimum harvesting dates of the various types are given.—J.S.

## MILLET AND SORGHUM

81 MARTIN, J. H. **Broomcorn—the frontiersman's cash crop.** *Econ. Bot.* 1953, **7,** No. 2, 163-81, illus. [Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

Notes are given on : the history of broomcorn (*Sorghum vulgare* var. *technicum*) cultivation in the USA ; the processes involved in broom manufacture ; and broomcorn varieties currently in use.—P.J.B.

82 WEBSTER, J. E. and others. **Sorghum sirup manufacturing tests, including the use of clay clarification and an evaluation of tested varieties.** *Bull. B-406. Okla. agric. Exp. Sta.* 1953, pp. 15, bibl. 11, illus.

Brief notes are given on the syrup yields and characteristics of 15 varieties of syrup sorghum tested during 1943-52 in Oklahoma.—P.J.B.

83† BISSET, W. J. **Competition and weedicide studies of mintweed (*Salvia reflexa* Hornem).** *Aust. J. agric. Sci.* 1953, **4,** No. 3, 249-55, bibl. 2.

Experiments to determine the value of selective herbicides and improved soil fertility for the control of mintweed in competition with crop species are described. Where mintweed was controlled by a selective herbicide the yield of sorghum and French millet (*Panicum miliaceum*) increased significantly. —From author's summary.

84 JONES, K. W. **Relation of witchweed (*Striga*) to fertility in tropical soils.** *Nature, Lond.* 1953, **172,** No. 4368, 128, bibl. 3. [Sudan Dep. Agric. For. Res. Fm, Wad Medani]

Results are reported of an experiment carried out near Gedaref, Eastern Sudan, in which grain yields of *Sorghum vulgare* were shown to be depressed by the presence in the soil of the root parasite *Striga hermonthica*. The author postulates that so-called worn-out" soils are in fact the result of *Striga* nfestation on the tropical lands of marginal rain- all.—M.H.

5 MEHTA, P. R. and others. **Varietal reaction of jowar to grain smut.** *Nature, Lond.* 1953, **172,** No. 4378, 591. [Kanpur, United Prov., India]

wenty-seven varieties of *Sorghum vulgare* have een tested for their resistance to *Sphacelotheca orghi*, and are classified as resistant (below 1% nfection), moderately resistant, susceptible and ery susceptible (above 15% infection). The two most resistant varieties are 31B and 4101.—M.H.

6 BOWDEN, J. and NEVE, R. A. **Sorghum midge and resistant varieties in the Gold Coast.** *Nature, Lond.* 1953, **172,** No. 4377, 551. [Dep. Agric., Accra]

he failure of *Sorghum* sp. to set seed in the Gold oast is due primarily to attacks by the sorghum midge, *Contarinia sorghicola.* The value of the orghum variety Nunaba in selection work to pro- uce a type with non-opening glumes (by which vipositing may be prevented) is recorded.—M.H.

7 VARENICA, E. T. and KOROVKIN, N. N. [**The biology of flowering and seed development in *Setaria viridis*.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 3, 28-30. [Inst. Grain Husb., Non-Black-Earth Belt]

his subject is discussed on the basis of observa- ions made during 1950 and 1951 with special egard to weather and temperatures prevailing in hese years in a locality near Moscow (Nemčinovka). here is also information on 1000-grain weight of amples of this millet taken from the upper, middle nd lower parts of the panicles in different varieties, amely, Yellow Grain 623, Bučanskaja 1, Egor- evskaja, and Istrinskaja.—M.H.

## ICE

8 RAMIREZ, F., E. Estudio económico estadístico del arroz, en Colombia, 1953. [**Economic and statistic study of rice-growing in Colombia, 1953.**] 1953, pp. 19. [Minist. Agric., Colombia]

9 ALLEN, E. F. and HAYNES, D. W. M. **A review of investigations into the mechanical cultivation and harvesting of wet padi with special reference to the latter.** *Malay. Agric. J.* 1953, **36,** No. 2, 61-80, bibl. 20, illus.

he progress made in experimental work on the mechanization of swamp-rice cultivation, under he wide variety of conditions existing in Malaya, reviewed. The chief rice-growing areas of Malaya are described under the headings of climate, soil-type and normal methods of cultivation. An account is given of the limitations imposed by the soil-type, climate and size of holding in the different regions on the mechanization of each operation involved in the growing of rice. Satisfactory progress has been made in the preparation of seed-beds on hard-pan soils with the aid of tractors equipped with special wheels and tracks for wet conditions. Harvesting trials with reapers, reaper-binders, headers and combine-harvesters are described. Under average conditions in Malaya, where holdings are small and soils tend to be damp at harvest time, a light header unit appears to be the most promising machine. Tests with various types of hand- and power-operated threshers indicated that economies could be made by the use of threshing-machines. In general, the threshers tested were insufficiently mobile for use in Malayan paddy-fields.—W.J.B.

90 PIACCO, R. L'irrigazione delle risaie. 1. Temperatura dell'acqua e del terreno durante il periodo irriguo. [**The irrigation of rice-fields. 1. Water and soil temperatures during the irrigation period.**] *Ital. agric.* 1953, **90,** No. 7, 493-6, illus. [Sta. Sper. Risicolt., Vercelli, Italy]

Information is given on the various systems of irrigating rice used throughout the world, the systems practised in Italy being (a) continuous submersion and (b) intermittent submersion. The Italian rice-fields receive about 30,000-40,000 cu. m. of irrigation water per ha. during 150 of the 160-175 days of the vegetative cycle of rice. It is thought that these large amounts of irrigation water, besides providing the water required by the plant, have the function of correcting the microclimate in a country situated near the northern limit of rice cultivation. Investigations are being conducted at the Vercelli Station to obtain experimental data on this question. In a trial, described in this first contribution, in which the rice variety Americano 1600 was sown on 8 May and harvested on 9 October, the field was kept continually under 10 cm. of water, the soil and water temperatures being recorded during the whole vegetative cycle. —E.B.O.

91 YOSHINO, O. and KAWASAKI, I. **The influence of the time of starting irrigation on the tillering and yield of rice plant in direct sowing culture.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 211-12, illus., English summary p. 212. [Yamagut Agric. Exp. Sta., Bofu Branch Sta., Japan]

The effect of irrigation applied at different times of the growing season on the tillering and yield of rice grown without transplanting was studied. The application of irrigation to plants at an early stage of growth gave rise to an early development of tillers. Irrigation applied at the 6-leaf stage gave the largest number of tillers. The largest yields of rice were obtained on plots where irrigation was first applied when the plants had reached the 9- to 12- leaf stage.—W.J.B.

92 Morita, K. **Studies on two times cropping of rice in North Kanto district and tentative classification of the zone of two crops a year in Japan from the point of temperature.** *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 249-50, English summary p. 250. [Agric. Train. Coll., Ibaraki Prefect., Japan]

Certain regions of Ibaraki Prefecture, Japan, were found suitable for double-cropping with rice. It was essential to harvest the first crop by 20 July and to use varieties adapted to cultivation in the early and late seasons of the year, respectively. The total yield of successfully grown double crops of rice was 50% greater than that of single crops. Double-cropping with rice was only possible where the mean air temperature in May exceeded 16°C. An attempt is made to classify the rice-growing areas of Japan according to their suitability for double-cropping.—W.J.B.

93 Silow, R. A. and Kjaer, A. **Report of the third meeting of the Working Party on Rice Breeding 1952.** *Devel. Pap. 30 FAO* 1953, pp. 48.

A report is given on the current progress of the FAO Rice Hybridization Project. Among co-operative research projects reported are those dealing with: resistance to lodging, interaction between varieties and manurial treatments, and photoperiodic response. It was recommended that rice varieties suitable for double-cropping (2 crops a year) should be developed.—P.J.B.

94 Ariyanayagam, D. V. **Saline paddy trials in the Eastern Division [Ceylon].** *Trop. Agriculturist* 1953, **109,** No. 1, 16-18.

Trials with salt-resistant varieties of rice were carried out in 1950-2 in the Batticaloa district where the salt-content of the soil varied from 0.2 to 0.44% and the pH from 4.4 to 6.6. In both years a local variety, Uvar Vellai, gave the highest yield and an Indian variety, SR 26, the second highest yield. Uvar Vellai gave 175% of the mean yield of all varieties tested in 1950-1 and 152% in the season 1951-2.—W.J.B.

95 Chandraratna, M. F. and others. **Seed dormancy in rice.** *Trop. Agriculturist* 1952, **108,** No. 4, 261-3, bibl. 1, illus. [Rice Res. Sta. Batalagoda, Ceylon]

The relationship between the seed dormancy and the photo-periodic sensitivity of 23 rice varieties, mostly indigenous to Ceylon, was determined in an experiment in which seeds of varieties of known photoperiodic sensitivity were subjected to germination tests at weekly intervals after harvest. The interval between the harvest date and the date at which 80% germination was observed was taken to represent the period of dormancy for each variety. In the group of varieties listed as relatively insensitive to variations in the photoperiod, the period of dormancy did not exceed 6 weeks. In the group listed as highly sensitive to photoperiod the period of dormancy varied between 6 and 12 weeks.—W.J.B.

96 Ariyanayagam, D. V. **Growth and developmental changes caused by pre-sowing treatment of seed paddy.** *Trop. Agriculturist* 1953, **109,** No. 1, 4-15, bibl. 4, illus. [Agric. Res. Sta., Hambantota, Ceylon]

The effects of various pre-sowing treatments of rice seed on the development of the resulting plants and the yields of paddy were determined in trials carried out in 1951-2 with seed of the variety Vellai Ilankalayan. In each of the treatments applied, except the control in which the seed was not pre-treated, the seed was subjected to the following three processes for varying lengths of time: (a) soaking in water, (b) exposure in a wet condition to air, (c) air-drying until completely dry. The greatest increase in yield of paddy over the control (36%) was obtained by the treatment in which the processes (a), (b) and (c) lasted 12, 6, and 2 hr., respectively. All the seed pre-treatments accelerated germination and flowering by a few days as compared with the control. Pre-sowing treatments increased tillering and hence the number of ears but not the number of grains per ear or the 100-grain weight. Data are given, illustrated by graphs, to show that the relative growth rate and the net assimilation rate of the plants grown from treated seed were greater than those of plants grown from untreated seed. The absolute moisture content of the plants from treated seed exceeded that of the control plants during a period up to 36 days only after sowing.—W.J.B.

97 Baba, I. and others. **Studies on the nutrition of rice plant with reference to Helminthosporium leaf spot. (Preliminary report.) 3. The nutrient absorption as affected by the water temperature.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 233-4, English summary p. 234. [Nat. Inst. Agric. Sci. Japan]

Rice plants were grown in a nutrient solution maintained at temperatures of 24-25°C., 29-32°C. and 36-39°C. (low, optimum and high temperatures). Both low and high temperatures reduced the absorption of nutrients as compared with the optimum temperature. The results of the experiment, showing the degree of absorption of the different nutrients at each temperature, are tabulated. According to the authors the high temperature of irrigation water in south-west Japan may be a factor contributing to the susceptibility of rice plants in that region to Helminthosporium leaf spot.—W.J.B.

98 BABA, I. and others. **Studies on the nutrition of the rice plant with reference to Helminthosporium leaf spot. (Preliminary report.) 4. Nitrogen metabolism as affected by hydrogen sulphide.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 235-6, English summary p. 236. [Nat. Inst. Agric. Sci. Japan]

The effect of the addition of $H_2S$ to a nutrient solution on the N metabolism of rice plants growing in the solution was determined. When large amounts of $H_2S$ were added, total N and N in the form of ammonia and protein decreased while the ratio of soluble N to protein N increased. It is suggested that $H_2S$ interferes with protein synthesis.—W.J.B.

99 BABA, I. and others. **Studies on the nutrition of the rice plant with reference to Helminthosporium leaf spot. (Preliminary report.) 5. Growth and nutrient absorption as affected by night temperature.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 237-8, English summary p. 238. [Nat. Inst. Agric. Sci. Japan]

Experiments were carried out in 1951 to determine whether the susceptibility of rice plants to Helminthosporium leaf spot was increased by faulty plant nutrition caused by high night temperatures. Treatment with high night temperatures (24.5°C.) compared with moderate temperatures (20.5°C.) for one month after heading, hastened ripening and retarded the normal development of grains, causing a reduction in yield. High night temperatures also reduced the $K_2O$ and $SiO_2$ contents of stems and leaves and increased the susceptibility of rice plants to Helminthosporium leaf spot. Both high and low (15.7°C.) night temperatures reduced the absorption of plant nutrients in the order $K_2O > SiO_2 > NH_3\text{-}N > MnO > P_2O_5$.—W.J.B.

100 MILLER, P. R. **Lowland rice culture as an economic control of Sclerotinia and root knot nematodes.** *Pl. Prot. Bull.* 1953, **1**, No. 12, 183-7.

In trials in Florida, the flooding of peat soil under lowland rice resulted in decomposition of the sclerotia of *Sclerotinia sclerotiorum* within 20 days; where the soil was under static flooding, sclerotia were decomposed within 35 days. Such practices also reduced soil infestation by the root-knot nematode *Meloidogyne incognita*.—P.J.B.

101 YAMADA, N. and others. **Study on the respiration of crop plants. 2. Changes in the respiration rate associated with the growth of the rice plant.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 195-6, illus., English summary p. 196. [Nat. Inst. Agric. Sci. Japan]

The respiration rate of various parts of the rice plant was measured throughout the period from sowing to the mature stage, both at a constant temperature of 30°C. and at the normal air temperature. The respiration rate was calculated both as output of $CO_2$ in mg. per hr. per mg. dry weight and as output of $CO_2$ in mg. per hr. per plant. The maximum respiration rate (calculated per mg. dry weight) occurs from 10 to 20 days after transplanting and corresponds in time with the maximum value of the growth rate. Apparent peaks in respiration rates were observed at the time of the differentiation of ear primordia, the formation of germ cells and heading.—W.J.B.

102 YAMADA, N. and IYAMA, J. **Study on the respiration of crop plants. 3. Gas contained within the rice plant with special reference to the gas in the root.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 197-8, illus., English summary p. 198. [Nat. Inst. Agric. Sci. Japan]

The amount and composition of the internal atmosphere of the rice plant was measured. The diurnal changes in the composition of the gas in the base of the root were affected by the intensity of solar radiation, soil temperature and, possibly, by the periodicity of cell division in the root. The seasonal changes in the proportions of $CO_2$ and $O_2$ in the root were recorded.—W.J.B.

103 COOLHAAS, C. and WORMER, Th. M. **Developmental differences in rice plants in relation to photoperiodism.** *Neth. J. agric. Sci.* 1953, **1,** No. 3, 202-16, bibl. 5, illus. [Lab. Trop. Crop. Husb., Wageningen]

Two varieties of rice sensitive to the length of photoperiod, Nero di Vialone and Kameji, and 2 insensitive varieties, Fortuna and Karang Serang, were subjected to daily photoperiods of 12 and 18 hr. applied either throughout the growing period or at various stages of the growing period. Earlier formation of panicles was induced by 12 hr. than by 18 hr. photoperiods in the case of Nero di Vialone and Kameji, but not in the case of Fortuna and Karang Serang. Where early flowering was induced by the use of 12 hr. photoperiods the panicles on the main stem were smaller than corresponding panicles on plants grown with 18 hr. photoperiods. The length of photoperiod had no direct influence on the growth of leaves. In the case of the sensitive variety Nero di Vialone, all tillers subjected to 12 hr. photoperiods from the beginning of growth entered the reproductive stage, after which a proportion of them ceased development, whereas a proportion of the tillers subjected to 18 hr. photoperiods from the beginning of growth ceased development before they had formed an inflorescence. A change from 12 hr. to 18 hr. photoperiods in sensitive varieties at the time of initiation of inflorescences caused a delay, and a change from 18 hr. to 12 hr. photoperiods, a hastening, of the subsequent development of flowers. The morphological characters of the axillary buds of rice plants at various stages of growth are described.—W.J.B.

104 ABARRA, L. A. **The influence of varying amounts of fertilizer and levels of moisture saturation on yield of Elon-Elon and Inintiw Strain 107 [rice].** *Philipp. Agriculturist* 1952, **35,** No. 10, 539-60. [Received 1953] [Cent. Exp. Sta., Laguna, Philippines]

In pot studies, the upland variety of rice Inintiw Strain 107 and the lowland variety Elon-Elon were each grown on soil maintained at 50, 70, 90, and 110% moisture saturation and receiving the equivalent of nil, 100, 200 and 400 kg. ammonium sulphate per ha. Both varieties grown in soil with 90 and 110% saturation flowered earlier than those grown in 50 and 70% saturations. Inintiw Strain 107 grown in soil with 90% saturation matured earlier than that grown in soil with 110% saturation. Compared with controls receiving no manure, applications of 200 and 400 kg. ammonium sulphate per ha. delayed the maturity of Inintiw Strain 107 by 1 to 3 days and Elon-Elon by 1 to 5 days, at all moisture levels. Inintiw Strain 107 gave the highest grain yields when grown in soil with 50% saturation receiving 400 kg. N manure per ha. In the case of Elon-Elon, highest grain yields were obtained from plants grown in soil at 110% saturation, but N treatments had only slight effects on grain yields. At soil saturation levels of 50% and where 400 kg. N manure per ha. were applied, grain yields were reduced, showing that N treatment may reduce the yields of lowland rice where soil moisture is deficient.—P.J.B.

## GENERAL

105 BORZAKOVSKIĬ, I. V. [**Stubble sowing of winter crops in Kazahstan.**] [Russian] *Doklady Vsesojuz. Akad. S-H. Nauk* (*Proc. Lenin Acad. agric. Sci.*) 1953, **18,** No. 7, 7-13. [Krasnopoljansk Machine Tractor Sta., Kokčetav Prov., Kazah SSR]

Details are supplied of the results obtained from tests made on various State and collective farms (in the Karagandinsk, Kokčetav and other provinces in north-east Kazahstan) with sowings of winter cereal crops made on stubble instead of on fallow. In addition to higher yields being obtained by this method of sowing, there is also some measure of protection from wind erosion, a menace to agriculture in these areas.—M.H.

106 MACINDOE, S. L. **Economic results of cereal breeding in Australia.** *CSIRO Conf. Cereal Breed. and Genet., N.S.W. 1951* Melbourne, 1952, 11-22, bibl. 5. [Received 1953] [Wagga]

This general account gives information on the early work done on wheat breeding in Australia, the importance of disease-resistant varieties, the improvement in baking quality of wheats, and the adaptability of some wheat varieties. The work done on oat and barley breeding is briefly summarized.—K.L.

107 RAW, A. R. **Review of cereal breeding in Victoria.** *CSIRO Conf. Cereal Breed. and Genet. N.S.W. 1951* Melbourne, 1952, 23-5. [Received 1953] [Wagga]

108 NEWTON, J. D. **Influence of soil zone on the chemical composition of cereals in Alberta.** *Canad. J. agric. Sci.* 1953, **33,** No. 4, 359-63, bibl. 7. [Univ. Alberta, Edmonton]

The average protein or N content of wheat, barley and oats was not related to the N content of the soil, as between brown and black soil zones, but was related to the N content of the soil as between black and grey-wooded soils. The average N content of wheat grain was about 3.6% on brown soils, 2.6% on black and 2% on grey-wooded soils. Respective values for barley were 3, 2.4 and 2.3%, and, for oats, 3, 2 and 1.9%. The N content of the black soils was considerably higher than that of the brown and grey-wooded soils. Black soils tended to produce grain with a lower P content than did brown and grey-wooded soils. The S content of grain grown on grey-wooded soils was low; that of grain grown on the other 2 soil types approached normal values. The K content of the crops was variable and relatively low compared with normal average values.—P.J.B.

109 ANDRÉN, F. Orienterande betningsförsök mot penselmögel på utsäde. [**Preliminary trials with seed treatments to control Penicillium moulds on seed.**] *Växtskyddsnotiser* 1953, No. 3, 38-9. [Stockholm]

The results are given of trials to determine the effectiveness of mixtures of TMTD and a mercuric fungicidal compound [not specified] for controlling Penicillium mould on combine-harvested cereal seed. The best combination was 50% TMTD + 1% mercuric compound dust, applied at the rate of 300 g. per 100 kg. seed. Results with dusts containing Arasan, 50% TMTD, or a combination of

25% TMTD + 1% mercuric compound, were only slightly less effective in controlling Penicillium.—P.J.B.

110 KNOWLES, G. **Selective control of wild oats in cereal crops by maleic hydrazide.** *Canad. J. agric. Sci.* 1953, **33**, No. 4, 402, illus. [Fld Husb. Div., Cent. Exp. Fm, Ottawa]

A brief note is given on some preliminary trials. Spraying cereal crops just before heading with 1 lb. maleic hydrazide per ac. plus a wetting agent, resulted in almost complete sterility, though heads emerged. In a mixed crop, spraying wheat, barley and linseed 6 days after heading, but when wild and cultivated oats were still at the " shot blade" stage, resulted in 9% sterile heads in barley, 16% in wheat, 40% in linseed and almost complete sterility in wild and cultivated oats. The germination of barley and linseed was unaffected by the treatment, while only 9% of the wheat seed germinated, compared with 92% germination in seed from untreated plots. Of the few wild oat seeds obtained from treated plots, only 7% germinated.—P.J.B.

111 FRYER, J. D. and ELLIOTT, J. G. **The effect of 2,4-D amine on clean cereal crops. Joint NAAS and ARC experiments 1951-53.** *Paper read at* 1st *Nat. Weed Contr. Conf., Gt Britain 1953* pp. 9. [A.R.C. Unit Exp. Agron., Oxford]

The preliminary results are given of trials to determine the effect of 2,4-D amine salt and MCPA Na salt on spring-sown cereal crops. In trials with spring oats, the greatest deformity was caused by spraying with 2,4-D and MCPA between the following growth stages: (a) 1-3 leaves, no tillers, plant height 0-6 in., and (b) 4-6 leaves, 0-1 tillers and plant height 6-9 in. MCPA caused less deformity than 2,4- D at equivalent rates of treatment. High-volume sprays appeared to cause less damage than low-volume sprays. Yields were most adversely affected by spraying at stage (b), and were much less reduced by MCPA than by 2,4-D. In trials with spring barley, rates of 0.5, 1, 1.5 and 2 lb. 2,4-D, and 2 lb. MCPA per ac. were applied, at pre-, or post-tillering growth stages. Considerable malformation and reductions in grain yield were caused by both materials applied when tillering was not complete; almost no damage and little reduction in yield followed treatments made when tillering was complete, but shooting had not started. There were no significant differences between the effects of high- and low-volume sprays. Post-tillering treatments with 1 and 2 lb. 2,4-D per ac. reduced yields by an average of 1.5 and 4.7%, respectively; reductions following similar pre-tillering treatments averaged 9.2 and 6.5%, respectively. The sprays did not significantly affect the dry-matter content, weight, germination, or malting quality of the grain; where adverse effects on grain quality were noted, they occurred in crops sprayed at the pre-tillering stage. In trials with spring wheat, head malformations were produced in plants sprayed when under 9 in. high, but not in plants 9-13 in. high. MCPA caused less malformation than 2,4-D at equivalent rates of treatment. High- and low-volume sprays differed little in this respect. Height of crop appeared to be a rapid and practical method for assessing the stage of plant growth. 2,4-D caused yield reductions in spring wheat; these reductions averaged about 6% where 2 lb. 2,4-D per ac. had been applied between the 3- and 10-leaf stages. Spraying had no effect on the dry-matter content of the grain, its germination, or its weight, but caused small increases in the N content.—P.J.B.

112 CARPENTER, K. and SOUNDY, M. **The effect of type of ester and formulation on the phytotoxicity of 2,4-D herbicides.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain 1953* pp. 10, bibl. 2, illus. [May and Baker Hort. Res. Sta., Ongar, Essex]

Experiments were carried out with different 2,4-D herbicides to establish methods of determining their toxicity to field crops under laboratory conditions. Preliminary reports indicate that the differences in the dry-weight increase of the laboratory-treated cereal plants measured over a fairly brief period are correlated with differences in the phytotoxicity to cereal crops of different 2,4-D ester formulations in the field as measured by grain yield.—W.J.B.

113 LUSH, G. B. **Observations on the application of 2,4-D and MCPA weedkillers.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain 1953* pp. 7. [Boots Pure Drug Co., Nottingham, England]

MCPA was applied to cereal crops at various centres in both sodium salt and amine formulations at rates of 6.4, 12.8 and 19.2 oz. acid equivalent per ac. and at high and low volumes. There was no difference in effect on weeds between the sodium salt and amine forms of MCPA. As a result of the trials, the weeds treated were divided into three groups according to their degree of susceptibility to MCPA: (a) very susceptible, (b) medium susceptibility, (c) less susceptible. The lowest rate was found suitable for the control of very susceptible weeds in the seedling stage. The medium rate gave good control of weeds of medium susceptibility and a useful check to the less susceptible weeds and the later stages of weeds of medium susceptibility. The highest rate was useful for application during cold spells and for controlling the later stages of weeds of medium susceptibility. It was found that MCPA could safely be applied to cereals at rates up to 21 oz. acid equivalent per ac. provided that susceptible stages of growth were avoided.—W.J.B.

114 LONGCHAMP, R. and others. Recherches sur les modifications du rendement des céréales par les hétéro-auxines désherbantes. [**Investigations into yield modifications of cereals caused by hormone weedicides.**] *Ann. Inst. Nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1953, **2**, No. 4, 669-706, bibl. 27, illus.

A number of trials was laid down in 1951 to determine the effect of aqueous emulsions of the ethyl ester and sodium salt of 2,4-D and of the sodium salt of MCPA, on the yield of wheat and oats. Of these chemicals, the ethyl ester of 2,4-D proved extremely toxic to wheat and oats and caused a considerable reduction in their yield. Varietal susceptibility was shown to occur in the presence of weedicides. Spring cereals were more susceptible than winter cereals to applications of the sodium salt of 2,4-D. MCPA, applied at the pre-emergence stage to the oat variety Multigrap at Rethel, resulted in a yield increase of 20%.—M.A.

115 ŠUMILENKO, E. P. [**Effectiveness of the preparation NIUIF-2 (Granosan) in controlling seed diseases of grain crops.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1952, **19,** No. 10, 67-70, bibl. 6. [Ural Filial Inst. Biol., Acad. Sci., USSR]

The work is concerned with the effect of Granosan in preventing damage to grain (in the Sverdlovsk Province) by species of *Alternaria, Fusarium, Helminthosporium* and bacteria.—M.H.

116 CHEREWICK, W. J. **Smut diseases of cultivated plants in Canada.** *Publ. 887. Canad. Dep. Agric.* 1953, pp. 58, bibl. 165, illus. [Pl. Path. Lab., Winnipeg]

Notes are given on control measures for the smut diseases of wheat, barley, oats, rye, sorghum, millet and maize, with descriptions of each disease. —P.J.B.

117 DUTHOIT, C. M. G. and NEWTON, H. C. F. **Cereal root eelworm on grasses in the West Midlands** [of England]. *Pl. Path.* 1953, **2,** No. 2, 72.

Cysts of *Heterodera* spp. were found in Shropshire in 1950 and 1951 on the roots of *Dactylis glomerata, Lolium perenne, L. italicum, Festuca elatior* and, to a smaller extent, *Phleum pratense.* A connexion between this infection and that of preceding and following cereal crops is indicated.—G.M.R.

118 KIČIGIN, A. A. [**Possible means of increasing the resistance of seedlings of summer grain crops to spring frosts.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **88,** No. 1, 153-6, bibl. 13.

Earlier works on this subject have shown that frost resistance in plants depends on the biological peculiarities of varieties in which hardiness changes with growth stage. From data in the Meteorological Station of the Komi Autonomous Republic covering the last 50 years, it has been noted that almost every year, during the period of vegetative growth, sowings of summer grain crops in the whole territory of Komi ASSR are subject to the action of frost three times at different stages of plant development. The authors have studied the relative resistance to frost of seedlings of the most important types of summer grain crops adapted to the early spring frosts in Komi ASSR. These frosts may occur 10-15 days after sowing and are characterized by their extremely low temperatures. The crops studied include the barley varieties SD 97/103, Mašin, Poljarnyi-14, Mestnyi, and the wheat variety Garnet. Summer grain crops usually do not have a long vernalization stage and the varieties Poljarnyi-14 and Mestnyi are characterized by their extremely short vernalization stage which, under conditions in Komi, may be completed at the time of seedling emergence. The author's experimental material comprised seedlings of numbered varieties (at the growth-stage of first-leaf appearance but at different stages of development). The plants were subjected to the action of frost with minimum temperatures (Centigrade) of —8.5°, —7°, —6.6°, —5°, —3.5°, and —2.7°. One set of seedlings was grown from vernalized seed (vernalization for 13 days at 4-5°C.) Another set of seedlings was obtained from seeds which were soaked in salt solutions (before sowing) for 48 hours at 18-20°C. The objectives were (1) to discover the influence of presowing vernalization on cold resistance of the seedlings ; and (2) to determine the changes in cold resistance which may be related to passing from the vernalization stage to the light stage of development. The records show that the upper level of temperatures which cause damage in seedlings of all barley varieties lies about —3°. Frosts with a minimum temperature of —6.6° or lower which occur in the Komi territory are ruinous for all five types of crops. Seedlings of Garnet wheat are most resistant to slight frosts (—2.9° or —3.5°). There is evidence that the relative resistance to cold of seedlings of the different types is not uniform. Garnet wheat, for example, is resistant to slight frost and quickly adapts itself to keener frosts, but the barleys Mestnyi and Poljarnyi-14 (less resistant to slight frost than Garnet) adapt themselves only gradually to keen frosts and are then much more resistant to such cold than is Garnet. Presowing vernalization (with resulting transition of the seedlings from e first stage of development to the second which accomplished from the moment of the action on em of frost) lowers the hardiness in seedlings. ernalized seedlings (compared with unvernalized) e damaged by frost more and have less capacity recover. There is evidence that the more resistt types (Mestnyi and Poljarnyi-14) on transition om the first to the second stage of development ow decreases in seedling hardiness more than do e less resistant types (SD 97/103 and Garnet). his confirms that the character of hardiness in ebly-resistant types sharply declines during the ssage of the vernalization stage in proportion the plants approach transition to the second age of development ; but in strongly-resistant pes this character changes less in passing the rnalization stage, but sharply declines in passing e light stage of development. It has been reported various workers that while several factors inuence the capacity of plants to tolerate low mperatures, a predominant role is played by rtilizers. The author reports also on the results tests made to study the influence of certain ineral fertilizers (sets of seed were soaked, for 48 ours at 18-20°C. before sowing, in solutions of Cl ; $NH_4NO_3$ ; $Na_2HPO_4$) on hardiness of edlings of spring-sown cereals in Komi ASSR. he tests (with controls) included sowings of each the above varieties in culture vessels filled with gillaceous soils. When the seedlings reached the ase of full development of the first leaf they were bjected to minimum temperatures of —4° and -7°C. The data show that seedlings from seeds eated with the solutions have greater resistance cold than the untreated controls. There is also idence of a specific influence of individual salts d a specific relationship of individual varieties presowing seed treatment. It is concluded that e effect of presowing treatment of seed in salt lutions on hardiness of seedlings is contrary to at of presowing vernalization, and that presowing ed treatment may be an important means of rotecting plants during early spring frosts.—M.H.

19 HÄNSEL, H. **Vernalisation of winter rye by negative temperatures and the influence of vernalisation upon the lamina length of the first and second leaf in winter rye, spring barley, and winter barley.** *Ann. Bot., Lond.* 1953, **17,** No. 67, 417-32, bibl. 17, illus.

he lowest effective temperature observed for rnalizing Petkus winter rye was —4.5°C., hereas —6° to —10°C. did not induce any astening of flowering. Seedlings of 20-25 mm. ngth were as susceptible to —3°C. as seeds in e stage at which the radicle had just broken rough the pericarp. Vernalizing temperatures ternating between 7 days + 1°C. and 3 days -3°C. were as effective as continuous treatment y + 1°C. The lamina length of the first and second leaf is shortened by raising the vernalizing temperatures from —3°C. to +3°C. and also is further shortened by prolonging the vernalization period in winter rye and winter barley. No progressive shortening of the lamina length, however, was observed in spring barley when treated like winter barley. This suggests a direct dependence of the lamina length of the first and second leaf on the degree of vernalization reached in the embryo. —Author's abstract.

120 BALDONI, R. Il trapianto del grano. [**Transplanting of wheat.**] *Macchine e Mot. agric.* 1953, **11,** No. 2, pp. 3, illus. [Ist. Agron., Univ. Bologna, Italy]

A machine made recently in Germany for transplanting cereals is illustrated and briefly described. The advantages offered by this practice are given. —E.B.O.

121 KORTENHORST, A. TH. and others. Ventileren en langzaam drogen van graan. [**Ventilation and slow drying of grain.**] *Publ. 20. Nat. Cttee Malt. Barley, Neth.* 1953, pp. 96, bibl. 13, illus.

The basic physical principles involved in drying combine-harvested grain are discussed. It is pointed out that effective bin-drying of grain, using unheated air, cannot be carried out when the relative humidity of the atmosphere exceeds 75%. Details are given of climatic conditions at 3 stations in the Netherlands, Den Helder (on the coast), Maastricht (inland) and De Bilt (intermediate between the first two) over the period May-December. On the average, the number of hours per day in July with an R.H. of 75% or less are 4, 10 and 12, respectively, at the three stations mentioned. For slow-drying with unheated air a higher rate of air-flow is required in the coastal than in the inland districts of the Netherlands in order to take advantage of the restricted periods during which air of less than 75% R.H. is available. Practical tests of various arrangements for sack- and bin-drying, with heated and unheated air, were made. Ventilated potato-stores were successfully converted for grain-drying.—W.J.B.

122 FOSTER, G. H. **Minimum air flow requirements for drying grain with unheated air.** *Agric. Engng, St. Joseph, Mich.* 1953, **34,** No. 10, 681-4. [Purdue Agric. Exp. Sta., Lafayette, Ind.]

123 ALLEN, H. P. **Progress report on crop desiccating experiments in the United Kingdom, 1952-53.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain, 1953* pp. 7, bibl. 9, illus. [Fernhurst Res. Sta., Pl. Protect. Ltd.]

Preliminary tests to determine the effect of numerous desiccating agents, applied to cereal crops from the air and from the ground, on the moisture content and yield of the grain at harvest are described. In the first series of tests in 1952, sprays of sodium chlorate/calcium chloride, sodium chlorate/pentaborate, sodium monochloracetate, sodium cyanate, IPC, and pentachlorophenol with diesel oil and water were applied to wheat and barley crops late in July. There was little difference between the rates of drying on the treated and untreated plots. The higher rates of chlorate/chloride and chlorate/pentaborate mixtures (5 lb. active material per ac.) caused yield reductions of as much as 1.7 cwt. per ac. In 1953, a desiccant containing sodium chlorate and a fire depressant, calcium chloride, and referred to as chemical No. 1 was applied at a rate of 10 lb. total product in 11 gal. water per ac. to a wheat crop 25, 18, 11 and 3 days before the grain on the untreated control plots reached "maturity" (defined as the stage at which the combining moisture-level content, 22% was reached). The application of chemical No. 1, 25 days before the maturing of the untreated grain, advanced maturity by 3 days but caused a reduction of 13% in the dry-matter yield compared with that of the control plots. Progressively later applications of the desiccant (18, 11 and 3 days before natural maturity) were decreasingly effective in hastening the maturity of the grain and had a decreasingly adverse effect on dry-weight yields. —W.J.B.

## LEGUMES

### SOYABEAN

124 BAGAEV, V. B. [**The effect of phosphorus nutrition on the composition of soyabean seed.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **91,** No. 4, 961-4, bibl. 7. [Timirjazev Agric. Acad., Moscow]

Phosphorus is of importance in plant nutrition because it determines the chemical composition of crops and its effect varies, depending on dosage and date of application. In tests with soyabean, certain authors have shown that there is an increase in oil and protein content of the seed when phosphate is applied to the medium in two doses before sowing, but if the same amount is given in one dose the increase in oil and protein content of the seed is much less. Other authors have maintained that in experiments on seed metabolism during ripening, there appears to be no connexion between the synthesis of P compounds and the accumulation of oil and protein. The object of the author's work was to determine the influence of P nutrition on the accumulation in soyabean seed of oil, protein and P compounds, at different stages of growth. The tests were carried out in water cultures containing Hellriegel's solution in modified form. In order to maintain a constant balance between monovalent and divalent cations in solution with a lowered concentration of P (or with total exclusion of P), potassium was supplied only as KCl, but phosphorus was supplied as compounds of two salts, namely, $Ca(H_2PO_4)_2$ and $Na_2HPO_4$. Nitrogen was supplied as $Ca(NO_3)_2$ and $NaNO_3$. The solution was changed 4 times during the vegetative period. The results are tabulated, showing (1) the effect on content of oil and protein in the seed of 3 variants of the test which include different amounts of P supplied at different stages of plant growth (germination to beginning of flowering; flowering to beginning of pod formation; and pod formation to complete seed-ripening): (2) the effect of the 3 variants on accumulation of total phosphoric acid in the seed at the different growth stages: (3) the effect of the 3 variants on accumulation in the seed of different forms of P compounds in non-ripe seed (60-day plants) and ripe seed (106-day plants); (4) the effect of the 3 nutrient variants on the relative contents of the different forms of P compounds in ripe seed. In the general discussion of the data obtained, it is recorded that an uninterrupted supply of phosphorus to the ripening seed may induce a greater capacity to synthesize nucleoproteids, but exclusion of P from the nutrient medium at the beginning of flowering leads to a relatively greater accumulation of phytin and saccharophosphates.—M.H.

125 YAMADA, N. and MURATA, Y. **The study on the respiration of crop plants. 4. Effect of 2,4-D on the respiration of plants.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 199-200, illus., English summary p. 200. [Nat. Inst. Agric. Sci. Japan]

An abnormal rate of respiration was observed in soyabean seedlings soon after they were sprayed with 2,4-D. An account is given of an attempt to correlate the respiration rates of 3 different parts of the seedling (the upper and lower halves of the hypocotyl and the cotyledon) with the varying degree of susceptibility of those parts to treatment with 2,4-D.—W.J.B.

### GROUNDNUT

126 CAUBÈRE, P. L'arachide en France. Résultats des premières études relatives à la sélection et à la culture. [**Groundnuts in France. Results of preliminary studies on their selection and cultivation.**] *Oléagineux* 1953, **8,** No. 8-9, 535-8, illus.

An account is given of trials with groundnuts carried out for 3 years in the south of France. It is

ought that there are possibilities of extending
is crop by irrigation in this region.—E.B.O.

7 NYASALAND AGRICULTURAL QUARTERLY JOURNAL. **Groundnuts.** *Nyasald agric. quart. J.* 1951, **10,** No. 4, 101-2.

pacing trials with groundnuts showed that the
oser the planting the greater the yield. A prac-
ral spacing recommended is : ridges 30 in. apart
ith 2 rows per ridge and 2 seeds per hole set 9 in.
part. Applications of 200 lb. per acre of a mixture
raw rock- and super-phosphate increased the
eld of groundnuts at Mbawa by nearly 300 lb.
its per acre. It was found that the local runner
pe gave a larger increase with phosphate than
inch types.—M.A.

8 LIGON, L. L. **Peanut varieties for Oklahoma.** *Bull. B-404. Okla. agric. Exp. Sta.* 1953, pp. 15.

rief descriptions are given of Argentine, Dixie
panish, Spanish 18-38 and Spantex groundnuts,
l of which are at present recommended for
klahoma conditions. The Tennessee Red, Jumbo
d Runner types have all proved unsatisfactory in
klahoma. In varietal trials during 1941-51 at
locations, Dixie (Spanish 146) gave the highest
eld of first-grade kernels, with 683 lb. per ac.,
llowed by Spantex, Spanish 13-10, Virginia
unner and Argentine, with 670, 653, 656, and
4 lb. per ac., respectively. Respective shelling
rcentages were 77, 75, 76, 68 and 75. Yields of
elled nuts were 733, 709, 686, 772 and 676 lb.
r ac., respectively.—P.J.B.

9 YORK, E. T. and REID, P. H. **Nutrient deficiencies in peanuts and their influence on fruit production.** *50th Proc. Ass. Southern Agric. Workers, New Orleans 1953* 51, [N. Carolina Agric. Exp. Sta., Raleigh]

pot trials, groundnuts were grown in cultures
hich produced symptoms of deficiency of all
ajor elements, except Cu and Mo. These de-
iency symptoms were also associated with
anges in the fruiting pattern of the plants.
eductions in size and dry weight of the plants in
ost cases were associated with proportionate
ductions in the number of reproductive nodes,
it had no effect on the proportion of vegetative
reproductive nodes. Reductions in numbers of
productive nodes were associated with a reduc-
on in total numbers of flowers produced and an
crease in flower numbers per reproductive node.
, Ca and K deficiencies markedly reduced the
imber of flowers which formed pegs. Boron
ficiency produced stunted plants, did not reduce
e numbers of reproductive nodes, but reduced
imbers of flowers per reproductive node and
evented peg production. It was considered that
rtain nutrient deficiencies may produce no outward symptoms, but may yet reduce the reproductive capability of groundnut plants.—P.J.B.

130 CHAUSSON, J. and OLLAGNIER, M. Fumure phosphatée de l'arachide en Casamance. [**Phosphatic manuring of groundnuts in Casamance.**] *Oléagineux* 1953, **8,** No. 8-9, 549-54, illus. [Inst. Rech. Huiles et Oléagineux]

131 REYNOLDS, H. and others. **Pesticides and flavor. Palatability and chemical studies on peanuts grown in rotation with cotton dusted with insecticides containing benzene hexachloride.** *J. agric. Food Chem.* 1953, **1,** 772-6, bibl. 3.

It is suggested that off-flavours developed in groundnuts which followed cotton dusted with insecticides containing BHC may be due to decomposition products of BHC.—J.S.

## PEA

132 SEELY, C. I. **Weed control in peas with herbicides.** *Proc 13th Western Weed Contr. Conf. 1952* 17-21. [Received 1953] [Idaho Agric. Exp. Sta., Moscow]

The results of trials in Idaho and Washington since 1947 in areas where pea crops are subject to wild oat infestation, showed that rates of 4 lb. IPC per ac. gave the best control of this weed. Over a 3-year period, pea crops treated with nil, 1, 2 and 4 lb. IPC per ac. gave pea yields of 554, 775, 950 and 1368 lb. per ac., and wild oat kills of 40, 59 and 85% for the 1, 2 and 4 lb. IPC treatments, respectively. Average yields, following pre-sowing and pre-emergence treatments with IPC were 1745 and 1099 lb. per ac., with 90 and 27% control of wild oats, respectively. Spray treatments were more effective than dusts. Working the IPC into the top 6 in. of soil gave better results than where it was worked into the top 3 in. Wettable IPC was preferable to the emulsified form. In trials to control broad-leaved weeds in peas, DNOSBP ammonium salt, Sodium K-1131 (sodium-dinitro-ortho-iso-propyl-phenate) and Ammonium K-1131 at rates of 2, 3 and 4 qt. per ac. and potassium cyanide at rates of 3.3, 6.6 and 10 lb. per ac. were applied. Sodium K-1131 gave considerably better results in terms of average yield increases over controls during 1949-51, than did the other materials, or the sodium salt and butyl ester of MCPA applied during one year only. With Sodium K-1131, the use of either 20 or 40 gal. water as a carrier gave similar results. Best pea yields followed the use of 2 qt. Sodium K-1131 per ac., though the 3 qt. per ac. rate was not much inferior. In comparisons of 2 dates of application, Sodium K-1131 gave better weed control and higher pea yields where applied when the peas were 8 in. tall, compared with where the peas were 5 in. tall.—P.J.B.

## BEAN

133 Ballatore, G. P. Alcune varietà di fava. [**Some bean varieties.**] *Ital. agric.* 1953, **90,** No. 4, 267-78, illus. [Ist. Agron. Univ. Palermo, Italy]

The field bean [*Vicia faba* var. *major*] is the most important renovating crop in Sicily where it is grown on 300,000 ha., but its yields per unit area are generally low. In this preliminary study, which preceded selection work, an account is given of results from field trials with 3 of the unimproved population-varieties of field beans most widely grown in Sicily, namely, Baggiana or Common, S. Pantaleo, and Leonforte or Caltagirone. A detailed morphological description and some data on the physiology are given for each variety.—E.B.O.

134 Picard, J. Recherches sur la féverole. [**Field bean investigations.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. B. Ann. Amélior. Pl.* 1953, **3,** No. 1, 57-106, bibl. 14, illus. [Sta. Cent. Génet. Amélior. Pl., Versailles]

In 1951-2 a detailed investigation was made at Versailles to classify different strains of field beans according to their morphological and physiological characteristics. Two main types were differentiated, Lorraine—*Vicia faba minor* sub-var. *minuta*—and Picardie comprising *Vicia faba minor* sub-var. *agrorum* and *Vicia faba equina* ; a winter type was also differentiated. Although fertilization was mainly autogamous, cross-fertilization did occur to an extent greater than that observed in other legumes. By an assessment of the characteristics of these beans, it was possible to suggest lines of improvement for the optimum production of green fodder and bean yields. Information is given on the different varieties of field beans and correct cultivation techniques.—M.A.

# ROOTS

## SUGAR-BEET

135 Mancini, E. Per il miglioramento della coltivazione della barbabietola da zucchero. [**The improvement of sugar-beet growing (in Italy).**] *Industr. saccar. ital.* 1953, **46,** No. 1-2, 2-7.

136 Lepri, P. Prove sull'epoca di semina della barbabietola da zucchero in Umbria. [**Sowing-date trials with sugar-beet in Umbria (Italy).**] *Industr. saccar. ital.* 1953, **46,** No 5-6, 181-5, bibl. 1.

In this sowing-date trial, carried out in 1952 with the sugar-beet varieties Mezzano N, Cesena P and Cesena Z, sowing took place on 3 March, 18 March and 4 April. It was confirmed that it is desirable to sow as early as possible [see also *Fld Crop Abstr* 5 : 148 and 4 : 128 and 762], as results indicated a daily decrease in the sugar yield (average for the 3 varieties) of 4.3 kg./ha. from sowing on 18 March, and 28.7 kg. from sowing on 4 April, as compared with the yield obtained from the earliest sowing.—E.B.O.

137 Shepherd, R. W. **The mechanical thinning of sugar-beet.** *Emp J. exp. Agric.* 1953, **21,** No. 83, 236-40. [Norfolk Agric. Sta.]

Pre- and post-war trials were designed to investigate the range of possible economies which could be effected in hand-labour when singling sugar-beet. Post-war experiments recorded an appreciable saving in singling time from cross-blocking ; part of this saving may have been due to the improved hand-hoeing conditions, the result of cultivation across the rows, but part was undoubtedly due to reduced plant-populations. The importance of establishing a full braird in any mechanical thinning operation is emphasized ; the intelligent use of rubbed seed assists in obtaining this.—M.A.

138 Jorritsma, J. De mechanisatie van de voorjaarswerkzaamheden in de bietenteelt. 1. Algemeen overzicht. [**The mechanization of spring work in connexion with sugar-beet-growing. 1. General survey.**] *Meded. Inst. rat. Suikerprod.* 1953, **23,** No. 1, bibl. 108, illus., English summary pp. 151-8, French summary pp. 159-67.

A survey is made of methods by which the labour required for the sowing and hoeing of sugar-beet may be reduced. The effects of different types of seed-beds on the germination of natural and rubbed seed, the use of precision drills and the effect of different methods of sowing on gapping and singling operations, are discussed. During 1948-51, samples of seed-beds, 10 cm. deep, from various types of soil in the Netherlands were collected at one location and were sown with rubbed seed and with natural seed. Rubbed seed yielded fewer seedlings per 100 seed-clusters planted than natural seed. The percentage of seed-clusters which produced one seedling or more was also lower in the case of rubbed seed. Rubbed seeds were more sensitive to the condition of the seed-bed than natural seeds. The lowest figures recorded in 1951 for the percentage of seed-clusters yielding seedlings were 59% for rubbed seed and 76% for natural seed. Germination rates were consistently low in soils with a poor soil-structure, the depression of germination rates on such soils being most marked in periods of unusually dry or wet weather. The variability of seed in regard to shape, size, weight and germination-capacity was tested in further experiments. There appeared to be a positive correlation between the specific weight of natural seed-clusters and their germination-capacity, especially in the case of small-sized seed. Germination energy (percentage germination after 5 days) was found to be a better indication of the field-performance of the seeds than germination capacity measured after 14 days.—W.J.B.

139 Leach, L. D. and Bainer, R. **The effect of reduced emergence upon the proportion of singles and doubles in field stands of sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol. 1952* 244-51, bibl 5. [Univ. California, Davis]

In the studies reported, observations were made on the number of single plants produced by whole, segmented and decorticated sugar-beet seed in the field, as compared with the number of single plants produced from seed germinated in the laboratory. Under both sets of conditions, the percentage of potential emergence was greater for decorticated than for segmented seed. On the basis of emergence per 100 seed units, decorticated seed which produced 43% of single plants in the laboratory, produced 69% of singles in the field. Respective figures for segmented seed were 81 and 82%. Decorticated seed produced approximately the same number of single plants per 100 in. of drill, as did segmented seed, while the total number of plants per unit of seed-row and the proportion of single plants were relatively lower. In comparisons of seedling emergence under controlled conditions and in the field, it was apparent that the proportion of single plants produced increased as the percentage emergence of the seed decreased ; thus, where conditions were adverse to sugar-beet seedling emergence, it was considered an advantage to use seed lots producing a high proportion of doubles.—P.J.B.

140 Canova, A. and Baldoni, R. Prove di disinfezione dei glomeruli di barbabietola. [**Trials in disinfecting sugar-beet seed-clusters.**] *Ann. Sper. agr.* 1953, **7,** No. 2, 385-93, bibl. 12, English summary p. 392. [Lab. Sper. Pat. Veg., Bologna, Italy]

Laboratory trials, in which sugar-beet seeds were treated with 6 different fungicides, showed that Fernasan (based on tetramethyl thiuramdisulphide), Mercurigamma and Agrosan GN were particularly effective for controlling the fungus *Phoma betae*, and that all the preparations tested had no effect on seed germination, even when they remained in contact with the seed for 20 days before germination. [See also *Fld Crop Abstr.* 5: 1175.]—E.B.O.

141 Parker, C. **Experiments with various pre- and post-emergence chemical treatments for weed control in sugar-beet.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain, 1953* 1-7.

Experiments carried out in 1953 on weed control in sugar-beet crops, in which pre-emergence applications of : borax, vapourising oil emulsions, PCP, sodium pentachlorophenate, IPC, Endothal, TCA, DCU, CMU, DNBP and sulphuric acid ; and post-emergence sprays of sodium chloride, sodium nitrate and ammonium sulphate were applied, are described. The effects of the various herbicides on the yields of sugar-beet are not yet reported. Granular borax at 200 lb. per ac. gave good control of numerous weeds but caused a severe check to beet plants. Among the other pre-emergence treatments tested, sodium pentachlorophenate in water and 50% PCP in water (Monsanto pentapaste) both at the rate of 4-8 lb. active material per ac. and 1-2 lb. per ac. PCP in a 25% vapourising-oil / 75% water emulsion applied at 100 gal. per ac. were the most promising. TCA and DCU were ineffective against broad-leaved weeds and did no harm to the beet plants at rates of 8 and 16 lb. per ac., respectively. CMU at 0.25-0.5 lb. per ac. and Endothal at 1-4 lb. per ac. gave good control of weeds but also checked the growth of the beet plants. Chickweed [*Stellaria media*] was susceptible to CMU but tolerated Endothal. Post-emergence treatments with 250-400 lb. NaCl or NaNO$_3$ in 100-200 gal. water, together with a wetting agent, gave good control of weeds when applied to the beet crop at the 2-4 leaf stage. The weeds fat hen [*Chenopodium album*] and orache [*Atriplex patula*] were resistant to NaCl and NaNO$_3$.—W.J.B.

142 Detroux, L. and Wauthy, R. Résultats de l'expérimentation, en champs d'essais, en 1952, de quelques désherbants sélectifs susceptibles d'être utilisés dans les cultures de betterave. [**Results of field experiments in 1952 with selective herbicides for use in sugar-beet cultivation.**] *Publ. Vulg. Inst. belge Amélior. Better.* 1953, **21,** No. 1, 17-35, bibl. 12 in text, illus., French, Flemish and English summaries pp. 34-5.

Trials carried out in 1952 on the use of herbicides against weeds in sugar-beet fields showed that none of the herbicides tested could be considered as positively selective in action. Of 10 herbicides tested, IPC (isopropylcarbamate) when applied in the post-emergence stage, afforded a good control of grasses. Where an early sowing was made, and before hoeing was possible, the use of herbicides was considered a good method for weed control. Applications of PCP (pentachlorophenol) petrol derivatives, Dow General (DNBP in admixture with petrol derivatives) and sodium trichloracetate (TCA) applied in the pre-emergence stage did not affect the development of young sugar-beet plants but retarded the growth of weeds.—M.A.

143 Aldrovandi, A. La cercospora della barbabietola da zucchero in Italia. [***Cercospora beticola* on sugar-beet in Italy.**] *Industr. saccar. ital.* 1953, **46,** No. 1-2, 8-27, bibl. 113, illus.

The conditions under which *Cercospora beticola* leaf spot attacks sugar-beet crops and the control measures adopted in Italy, particularly in the Veneto, are reviewed. There are varieties resistant to *Cercospora beticola* but none is immune. In trials carried out in the Veneto in 1952, in which sugar-beet crops were sprayed 3-4 times with 2% Bordeaux mixture or 3% copper oxychloride at intervals of 15-20 days during the period 10 June-9 August, increases in root yield of 4000-7000 kg./ha. were obtained, while the roots had a higher sugar content. This corresponded to an increase of 1000-1500 kg. of sugar per ha. [See also *Fld Crop Abstr.* 5 : 1176.]—E.B.O.

144 Girginkoc, H. R. Untersuchungen über die "Zwarte Houtvatenziekte" der Futter- und Zuckerrübe, verursacht durch *Pythium irregulare* Buisman. [**Investigations into black vessel disease of fodder- and sugar-beet, caused by *Pythium irregulare* Buisman.**] *Meded. LandbHogesch., Wageningen* 1951, **51,** No. 1, 1-61, bibl. 56, illus., English summary p. 58. [Lab. Phytopath. Landb-Hogesch., Wageningen]

From field observations, this disease was found to occur on sandy soils and was favoured by wet and cool weather during May and June. It was shown that the disease affected plants grown in sterilized soil more severely than those grown in unsterilized soil. The symptoms are described and the results of laboratory investigation given. Control measures recommended include the liming of acid soils, drainage of wet soils, the application of farmyard manure and the destruction of weeds.—M.A.

145 Hull, R. **Assessments of losses in sugar beet due to virus yellows in Great Britain, 1942-52.** *Pl. Path.* 1953, **2,** No. 2, 39-43, bibl. 2. [Rothamsted Exp. Sta.]

146 Kato, K. and Hosokawa, S. **On the special requirement for artificial germination of sugar-beet pollen.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1953, **21,** No. 3-4, 298-9, illus., English summary p. 299.

Various culture media for the artificial germination of sugar-beet pollen were tested. When a normal medium containing 1% agar and 25% sucrose was used, the highest percentage germination obtained was 25. When 0.005% boric acid was added to the same medium and the pH maintained at 4.6, germination was increased by 8%. No germination was obtained in distilled water. A germination of 30% was obtained in a medium of distilled water to which 0.005% boric acid was added.—W.J.B.

147 Fife, J. M. and Price, C. **Bolting and flowering of sugar beets in continuous darkness.** *Pl. Physiol.* 1953, **28,** No. 3, 475-80, bibl. 10, illus. [U.S. Sug. Pl. Fld Lab., Riverside, Calif.]

Sugar-beet roots developed seed stalks in complete unbroken darkness during a long thermal induction period at 40°F. Large roots bolted and flowered in continuous darkness following a long thermal induction period in complete darkness over a range of temperature from 60 to 82°F. Seed stalks were initiated as readily and in as great a number when grown in continuous darkness as on similar roots grown in a long day, but a much higher percentage of the beets grown in a long day flowered. The evidence shows that light, during or following a long thermal induction period, is not necessary for the initiation of seed stalks and that a long day is not an absolute essential to the flowering of sugar-beets.—Authors' summary.

148 Sinjagin, I. I. and Morozova, N. P. [**Some peculiarities of development in sugar-beet in the third year of life.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **91,** No. 3, 671-3, illus. [All-Union Sci. Res. Inst. Beet Husbandry]

Sugar-beet, under normal conditions, is a biennial plant which forms rosette leaves and a thick root with high sugar content in the first year. In the second year, from buds formed on the root neck, flowering stems develop and ripe seeds are produced at the end of the vegetative period. Of these buds, not all develop in the second year. Some remain dormant until the third, or even the fourth years. By planting-out the roots in the 3rd year these buds produce new stems. It is maintained that the buds represent a qualitatively different stage of development which rarely appears in the second year, but is often seen in the 3rd year of life. Some of the buds with a short developmental stage form new flowering stems in the 3rd year, but others, with a more prolonged developmental stage, produce, at first, rosette leaves similar to the rosette leaves in the first year of the parent plant's life. The production of rosette leaves is associated with the initiation of a new root from the periphery of the old root. The function of this new root in maintaining perenniality of the beet is discussed vth reference to the developmental cycle found in sme wild beets, e.g. *Beta lomatogona*, and in wild frms of chicory.—M.H.

19 THORNE, G. N. and WATSON, D. J. **Plant nutrition. Uptake of nutrients from solution sprayed on leaves** [**of sugar-beet and wheat**]. *Rep. Rothamst. exp. Sta. 1952* Harpenden, 1953, 66-8.

he results of 3 experiments are reported. Chemical nalyses were made of sugar-beet which received liar sprays with N, P and K solutions separately nd in all combinations in the experiments already ported [See *Fld Crop Abstr.* 6 : 828]. The analyses owed that the uptake of any nutrient from pray was the same whether or not other nutrients ere present in the spray. Increased absorption of nutrient through the leaves gave rise to increased osorption of other nutrients from the soil. The pparent recovery by sugar-beet plants of N, P and was 50, 20 and 50%, respectively, in the case of liar sprays and 20, 10 and 30%, respectively, in he case of nutrients applied to the soil. A field xperiment was carried out to investigate the ssibility of increasing the protein content of gar-beet tops by foliar spraying with nitrogenous lutions. Solutions of ammonium nitrate (3%) nd urea (2.3%) supplying equal amounts of N ere used and gave similar results. The dry weight nd protein content of the leaves and the N content the whole plants at harvest were both increased a greater extent by foliar than by soil sprays. a field experiment with wheat, foliar sprays of mmonium nitrate in May and June were compared ith identical sprays applied to the soil and with he same quantity of N applied as a top-dressing of itro-chalk in April. No significant differences ere found in yield of grain resulting from the ree different methods.—W.J.B.

50 MORANI, V. Esperienze di concimazione sodico-potassica alla bietola nel comprensorio di Pontelongo. [**Trials on sodium-potassium manuring of sugar-beet in the Pontelongo district (Italy)**.] *Industr. saccar. ital.* 1953, **46,** No. 5-6, 167-70, bibl. 17.

51 PANELLA, A. Un biennio di prove sull'irrigazione e concimazione della barbabietola da zucchero in Umbria. [**Two years' trials on sugar-beet irrigation and manuring in Umbria (Italy)**.] *Industr. saccar. ital.* 1953, **46,** No. 5-6, 171-80, bibl. 7.

52 ANTONELLI, C. La fertilizzazione dei terreni a barbabietole. 3ª annata di esperienze. [**The manuring of the soils under sugar-beet (in Italy). Third year's trials.**] *Industr. saccar. ital.* 1953, **46,** No. 7-8, 259-62.

153 SIMON, M. and WAUTHY, R. La nécessité des engrais verts pour augmenter la productivité des terres à betterave. [**The necessity for using green manures to increase the productivity of sugar-beet soils.**] *Publ. Vulg. Inst. belge Amélior. Better.* 1953, **21,** No. 2, 28-45, bibl. 7 in text, illus.

An appreciation is given of the value of green manures in promoting good soil structure and in enhancing the yield of sugar-beet. Of green manures sown in the spring, mention is made of *Medicago lupulina* and directions for its cultivation in France are given. Suitable summer varieties listed include *Vicia sativa*, *Pisum arvense*, *Vicia faba* and *Trifolium incarnatum*.—M.A.

154 CIFERRI, R. Prime prove circa l'impiego dell'idrazide maleica nella conservazione delle barbabietole. [**Preliminary trials on the use of maleic hydrazide in sugar-beet storage.**] *Industr. saccar. ital.* 1953, **46,** No. 5-6, 186-7, bibl. 8.

Spraying sugar-beet plants 20 days before harvest with a 0.2% solution of maleic hydrazide was found effective in preventing both a loss in weight and a decrease in the sugar content of the roots after about 40 days of storage.—E.B.O.

## FODDER-BEET

155 MANNER, R. Försök med foderrotfrukter vid Ullevi 1944-50. [**Varietal trials with fodder root crops at Ullevi, 1944-50**] *Medd. Gulläk. Växtförädl. Anst.* 1952, No. 9-10, 203-12, bibl. 4, illus., English summary p. 211.

In trials during 1944-50 at Ullevi, Ostergötland, in south-east Sweden, the Barres mangel varieties, Hammenhög, Slättbo II and Halvlång gave mean yields of 111, 107 and 110 decitons (100 kg.) of dry matter per ha., and averaged 14.6, 14.3 and 13.5% dry-matter content, respectively. In comparisons between different types of fodder-beet, Globus, Barres Hammenhög, Ljusröd fodder sugar-beet and Gullåker gave mean dry-matter yields of 92, 111, 114 and 121 decitons per ha., and had average dry-matter contents of 12.6, 14.5, 17.1 and 21%, respectively. In trials with swede varieties, Hammenhög's Bangholm, Gul Svensk, Patria Wilhelmsburger, Gullåker II and Göta II gave mean dry-matter yields of 69, 63, 67, 65 and 62 deciton per ha., and had average dry-matter contents of 11.4, 10.9, 10.8, 10.1 and 9.4%, respectively. During the trial period, the dry-matter yields of the swede varieties declined relative to those of the fodder-beet varieties, mainly owing to a progressive decrease in dry-matter content.—P.J.B.

156 NORTHERN IRELAND. Ministry of Agriculture. **Potato and fodder beet variety trials**

**and fodder beet manurial trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1953, **28,** No. 2, 44-7.

In a fodder-beet variety trial using Pajbjerg Rex X, Red Otofte X and Hunsballe X, the last-named had the highest percentage of dry matter in the roots but produced the lowest yield of dry matter per acre. Both this variety and, to a lesser extent, Pajbjerg Rex X were difficult to lift due to the branching and grooving of the roots. Red Otofte X gave good yields with well-shaped roots. The effect of ammonium sulphate applied at two levels as a whole and as a split application to Hunsballe X showed that the yield of dry matter per acre was increased by the application of 2 cwt. ammonium sulphate per acre as compared with only 1 cwt., but was actually depressed by the use of a further cwt. The application of 2 cwt. muriate of potash or 4 cwt. per acre of coarse salt raised the dry-matter content of fodder-beet.—M.A.

157† NORTHERN IRELAND. Ministry of Agriculture. **Reports from the counties.** *Mon. Rep. Minist. Agric. N. Ire.* 1953, **28,** No. 3, 70-6.

In a fodder-beet variety trial, in 1952, in County Antrim, there was little yield difference between Pajbjerg Rex X, Hunsballe X, and Red Otofte X, except that the roots of Hunsballe X were difficult to lift and clean due to their much-branched root system. Roots of Red Otofte X were well-shaped and easy to lift. In one trial in County Londonderry, both Pajbjerg Rex X and Red Otofte X produced about 1 ton of roots more per acre than Hunsballe X.—M.A.

158 NORTHERN IRELAND. Ministry of Agriculture. **Reports from the counties. Fodder beet variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1953, **28,** No. 4, 107-8.

Trials were carried out on well-manured soils at 3 farms in County Tyrone to compare the total yields and yields of dry matter obtained from Red Otofte X, Pajbjerg Rex X and Hunsballe X. Red Otofte X gave the highest yield of roots per ac. The total yields of roots and tops in tons per ac. were 29.825 from Pajbjerg Rex X, 29.5 from Red Otofte X and 24.575 from Hunsballe X. The total yields of dry matter per ac. from the same varieties were 4.675, 4.65 and 4.05 tons, respectively. Thus Hunsballe X, which had the highest percentage of dry matter in the roots, yielded less dry matter per ac. than the other two varieties. The results of the experiments were in agreement with those from similar experiments carried out in 1951. Red Otofte X was the most satisfactory variety as regards ease of lifting and cleaning.—W.J.B.

159 NORTHERN IRELAND. Ministry of Agriculture. **Reports from the counties. Fodder beet variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1953, **28,** No. 6, 176-7.

The yields of three varieties of fodder-beet were compared at 14 centres in Northern Ireland. Pajbjerg Rex X, Red Otofte X and Hunsballe X yielded on the average 18.05, 18.3 and 13.6 tons of roots and 5.45, 5.1 and 4.8 tons of dry matter per ac., respectively.—W.J.B.

## TURNIP

160 JOSEFSSON, A. Tetraploida rovor, förädling och försök vid Sveriges Utsädesförening. [**Tetraploid turnips: breeding and field trials carried out by the Swedish Seed Association.**] *Sverig. Utsädesfören. Tidskr.* 1953, **63,** No. 3, 165-80, illus., English summary pp. 179-80.

The results are given of trials with tetraploid and diploid forms of Svalöf's Bortfelder, Svalöf's Yellow Tankard, Svalöf's Östersundom and Svalöf's Sirius, produced from a bulked cross between tetraploid Bortfelder, Yellow Tankard and Östersundom. In each case, the diploid and tetraploid types of the same variety were compared. When compared with diploid Bortfelder, the tetraploid type gave 19% higher root yields, 9% higher dry-matter yields and had 0.7% lower dry-matter content in 22 trials. Tetraploid Yellow Tankard gave 41% higher root yields, 23% higher dry-matter yields and had a dry-matter content 0.9% lower than the diploid in 11 trials. Tetraploid Östersundom gave root yields 18% higher, dry-matter yields 2% higher and had a dry-matter content 0.4% lower than diploid Östersundom in 17 trials. Compared with diploid Bortfelder, Sirius gave 49% greater root yields and 29% higher dry-matter yields; in comparison with Östersundom, respective yields were 21 and 15% higher. Respective crude-protein contents in the roots of Sirius and diploid Östersundom were 9 and 12%, crude-fat contents 2.1 and 1.7%, and ash contents 7.3 and 9.7% on a dry-matter basis. The tetraploid types gave an average yield of 17% less tops than did the diploids. On soils infected with bacterial diseases, including *Pseudomonas destructans* and *P. campestris*, the tetraploid types were more susceptible than the diploid. Observations indicated that the tetraploids were more resistant to club root (*Plasmodiophora brassicae*) than the diploids, though such evidence was not conclusive. The 1000-grain weight of the tetraploids was 60-70% higher than that of the diploids.—P.J.B.

## POTATO

161 GUIMARAES, F. F. **Potato growing in Brazil.** *Amer. Potato J.* 1953, **30,** No. 5, 124-9. [Esta. Exp. Horticult., Domingos Petrolini, Rio Grande do Sul, Brazil]

62 SKOGLEY, C. R. **Results with various chemicals for potato vine killing.** *Amer. Potato J.* 1953, **30,** No. 6, 140-2, bibl. 2. [Rhode Island Agric. Exp. Sta., Kingston, R.I.]

Five years of trials confirmed the value of using hemical preparations for potato haulm-killing. Although not necessarily more effective than other methods of haulm-killing, the use of chemicals was considerably less expensive than either aming or roto-beating. Two commercially prepared arsenical preparations, Penite 6 and Vinetox, gave the best results during the testing period and were among the least expensive chemicals tested.—E.B.O.

63 DEARBORN, C. H. and others. **Knik, a new potato variety for Alaska.** *Amer. Potato J.* 1953, **30,** No. 6, 148-9. [Alaska Agric. Exp. Sta., Palmer and Fairbanks]

A description and the characteristics of this variety are given.—E.B.O.

64 NORTHERN IRELAND. Ministry of Agriculture. **Reports from the counties. Potato variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1953, **28,** No. 6, 175-6.

Five main-crop varieties of potatoes: Arran Banner, Ulster Supreme, Majestic, Stormont Dawn, and Arran Peak were tested at 14 centres in Northern Ireland in 1952. The highest total yields and yields of ware-size potatoes were given by Arran Banner and Ulster Supreme. When the yields of the previous 6 years' tests are taken into account, Arran Banner gave the highest average yield of all sizes of potato (15.83 tons per ac.) and Stormont Dawn the second highest average yield. Ulster Supreme, first included in the trials in 1950, performed well and, on the average, was only slightly outyielded by Stormont Dawn.—W.J.B.

165 ANDERSEN, E. T. and SANDAR, N. **Description of the "Manota" variety of potato.** *Amer. Potato J.* 1953, **30,** No. 2, 50-2. [Univ. Manitoba, Winnipeg, Canada]

166 RIGOT, N. Résultats de l'expérimentation de variétés fourragères de pommes de terre dans trois régions agronomiques belges. [**Experiments with fodder potato varieties in three Belgian agricultural regions.**] *Ann. Gembl.* 1953, **59,** No. 3, 168-83, bibl. in text.

Trials were laid down at Juprelle, Carlsbourg and Orval between 1949-52 with 46 varieties of potatoes to determine those most suitable for Belgian conditions. The results showed that the varieties with the highest dry-matter content were also the highest yielders. Capella and Ultimus, gave the highest dry matter yields per ha. at Orval; Capella, Ultimus and Aquila at Carlsbourg, and Eigenheimer and Gineke at Juprelle.—M.A.

167 LARGE, E. C. **Potato blight forecasting investigation in England and Wales, 1950-52.** *Pl. Path.* 1953, **2,** No. 1, 1-15, bibl, 8, maps. [Pl. Path. Lab., Harpenden]

Experience to date in one "blight year" (1950) and in 2 years (1951-2) in which blight was generally late, except in the west, "has shown that notifications of Beaumont periods occurring in screens at the synoptic weather stations enable broad regional forecasts of date of blight outbreak to be made successfully, for all regions of England and Wales, provided that the indications from the whole network of stations are taken into account by an operations-chart method of working."—G.M.R.

168 PETERSON, L. C. and MILLS, W. R. **Resistance of some American potato varieties to the late blight of potatoes.** *Amer. Potato J.* 1953, **30,** No. 3, 65-70, bibl. 18. [Pennsylvania Agric. Exp. Sta.]

169 DOROŽKIN, N. A. [**Agrotechnical measures for the control of wart disease** [*Synchytrium endobioticum*] **in potato.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* (*Proc. Lenin Acad. agric. Sci.*) 1953, **18,** No. 7, 3-6, bibl. 7. [Acad. Sci., White Russian SSR]

The measures discussed include: summer planting of potatoes (20-25 June); the use of black fallow [an early, clean fallow produced on land, in good heart, usually by cultural treatment in autumn and the following spring before being sown with a spring crop] to stimulate growth of the fungal sporangia at a time when conditions of the substratum are unfavourable for spore survival; the introduction of a herbage ley in a rotation of crops; and the use of wart-resistant varieties of potatoes. —M.H.

170 FLAMINI, B. Prove di lotta anticercosporica in diversi comprensori bieticoli della Pianura Padana. [**Trials in controlling *Cercospora beticola* in different sugar-beet regions of the Po Plain.**] *Industr. saccar. ital.* 1953, **46,** No. 7-8, 263-73, bibl. 30, illus.

An account is given of trials carried out in 3 different localities in the Po Plain, Italy, to study the control with copper preparations of *Cercospora beticola* leaf spot on 2 sugar-beet varieties, Klein Wanzleben E (early and susceptible) and Alba 921 (late and resistant). Results showed that at Agna, where the infection was strong, and at Portomaggiore, where the infection was of medium intensity, the copper treatments were effective and economically advantageous on both varieties, whilst at Mezzano, where the infection was weak, the treatments had no influence on yield. [See also Abs. 143.]—E.B.O.

171 THIRUMALACHAR, M. J. and PUSHKARNATH.

**Resistance of potato varieties to charcoal rot** [*Macrophomina phaseoli*]. *Amer. Potato J.* 1953, **30,** No. 3, 73-7, bibl. 7. [Cent. Potato Res. Inst., Patna, Bihar, India]

172 Lutz, J. M. **Fusarium tuber rots of late potatoes as related to injuries and certain chemical treatments.** *Amer. Potato J.* 1953, **30,** No. 6, 131-4, bibl. 6. [U.S. Dep. Agric., Bur. Pl. Industr., New York]

Potatoes with digger cuts and bruises were much more susceptible to Fusarium tuber rots than tubers without these defects. Digger cuts made potatoes more susceptible to rot than did bruises. None of the chemical treatments tested was effective in reducing storage rots.—Author's summary.

173 Ellison, J. H. and Cunningham, H. S. **Effect of sprout inhibitors on the incidence of Fusarium dry rot and sprouting of potato tubers.** *Amer. Potato J.* 1953, **30,** No. 1, 10-14, bibl. 3. [Cornell Univ., Ithaca, N.Y.]

Fusarium dry rot in potato tubers in storage was increased by treatment with sprout inhibitors containing methyl ester of α-naphthaleneacetic acid (MENA) as the active agent. Dusts carrying 2,3,5,6-tetrachloronitrobenzene (TCNB) had no effect on the incidence of dry rot in the tubers. Sprouting was controlled satisfactorily by MENA at 1 g./bu. and by TCNB at 2.7 g./bu. of potatoes. TCNB at 1 g./bu. did not inhibit sprouting satisfactorily.—From authors' summary.

174 Dudley, J. E. and others. **Control of potato insects.** *Fmr's Bull. 2040. U.S. Dep. Agric.* 1952, pp. 52, illus.

175 Wallis, R. L. **Relation of time of planting potatoes to tuber flea beetle** [*Psylliodes affinis*] **attack in Nebraska and Wyoming.** *Amer. Potato J.* 1953, **30,** No. 3, 70-2, bibl. 4. [U.S. Dep. Agric., Bur. Ent. and Pl. Quarant., Scottsbluff, Nebraska]

176 Hedou, J. and others. Le Laboratoire de Sérologie de Bréhoulou. [**The serological laboratory at Bréhoulou.**] *Pomme de terre fr.* 1953, **16,** No. 167, 3-8.

An account is given of results obtained at the above laboratory in France in controlling virus diseases of potatoes by serum diagnosis, together with notes on the susceptibility of potato varieties to these diseases. [See also *Fld Crop Abstr.* 6 : 669.] —E.B.O.

177 Cairaschi, E. A. and Carton, H. Aspects nouveaux de la sélection des plants de pommes de terre. Observations concernant la pullulation des pucerons-vecteurs des maladies à virus et les traitements aphicides. [**New aspects of the selection of seed potatoes (in France). Observations on the multiplication of the aphid vectors of virus diseases and aphicidal treatments.**] *Pomme de terre fr.* 1953, **16,** No. 167, 13-23, bibl. 6.

178 Lamers, D. H. R. **Insecticides against aphid vectors of potato viruses.** *Neth. J. agric. Sci.* 1953, **1,** No. 3, 188-201, bibl. 5, illus.

The effect of applications of Systox on the occurrence of leaf roll and virus Y diseases in Bintje potatoes grown for seed and on the populations of the insect vectors of the diseases, was studied in an experiment in which the central row of each plot of virus-free seed was sown with seed infected with either virus Y or leaf-roll. Applications of Systox at a concentration of 1% and at a rate of 1300 l. per ha. at plant-emergence were followed by applications at a rate of 2000 l. per ha. at 10-day intervals up to the time of the death of the foliage. Few aphids (*Myzus persicae* and *Aphis nasturtii*) were found on plots treated with Systox. Applications of Systox reduced the incidence of leaf-roll considerably in the first 3 rows of potatoes on either side of the central row of secondary diseased plants. In rows further removed from the central row, the effect of the treatment on the incidence of leaf-roll was negligible. It is deduced from these results that Systox is effective in preventing the spread of leaf-roll in the immediate vicinity of diseased plants, when they are treated, but ineffective in preventing the infection of sprayed plants by winged aphids from unsprayed areas. Systox did not prevent the spread of virus Y.—W.J.B.

179 Soliman, A. A. **Leafroll of potatoes as a storage problem.** *Amer. Potato J.* 1953, **30,** No. 2, 35-45, bibl. 5, illus. [Minnesota Agric. Exp. Sta.]

The percentage of potato tubers in store infected with leafroll was shown to be directly correlated with the density of aphid population feeding under storage conditions. It was proved that the virus was able to pass from one eye at either end of the tuber to the other end within 15 days. Recommendations for the control of the leafroll virus under storage conditions are suggested.—From author's summary.

180 Bonde, R. **Preliminary studies on the control of bacterial decay of the potato with antibiotics.** *Amer. Potato J.* 1953, **30,** No. 6, 143-7, bibl. 1, illus. [Maine Agric. Exp. Sta., Orono]

Results from trials carried out to determine whether antibiotics could be used to control the decays which often occur in potato tubers and seed-pieces, showed that dihydrostreptomycin sulphate and streptomycin sulphate were effective in reducing the soft-rot caused by the bacterium *Erwinia atroseptica*. Streptomycin sulphate gave complete control of the soft-rot on potato slices following a 30 min. immersion at a concentration of 10 ppm. It was also shown that dihydrostreptomycin sulphate and streptomycin sulphate solutions did not inhibit the decay caused by the soil organism *Pseudomonas fluorescens* but that aureomycin, which possessed no inhibiting properties for the soft-rotting bacteria, was effective in controlling the decay caused by *P. fluorescens*.—E.B.O.

181 ELLISON, J. H. **Varietal susceptibility to internal brown spot of potatoes.** *Amer. Potato J.* 1953, **30,** No. 4, 92-4, bibl. 3. [Cornell Univ., Ithaca, N.Y.]

ncidence of internal brown spot associated with various potato varieties grown on Long Island from 1 to 4 years is reported. Some varieties, such as Pontiac, Kennebec, Katahdin and Mohawk, were relatively resistant to brown spot each year. Ashworth was quite consistently susceptible. Other varieties, such as Essex, Sebago and Ontario, fluctuated considerably from year to year.—Author's summary.

82 PETERSON, G. and SVENSSON, E. Rostfläcksjuka på potatis. [**Rust spot disease on potatoes.**] *Lantm. Svenskt Land* 1953, **37,** No. 38, 867-9, illus.

Notes are given on rust spot of potato tubers in Sweden. The cause of the conditions is not yet known. In trials in south Sweden during 1950-1 o determine the incidence of rust spot in different varieties, the following approximate mean percentages of rust-spotted tubers were found : 50% or Alpha, 8% for Arran Consul, 1 to 2% for Ackersegen, Elsa and Craig's Defiance, nil to 1% or President and nil for Bintje.—P.J.B.

83 KELLEY, R. A. and others. **Potato foliage development.** *Amer. Potato J.* 1953, **30,** No. 2, 29-34, bibl. 12, illus. [Dep. Agric., Ottawa, Canada]

ncreases in the height and width of potato plants n New Brunswick in 1951 were greatest during he fifth week after emergence. The average daily ncrease at this time was approximately 0.7 in. in height and 0.8 in. in width. The thickness of the main stalk increased most rapidly from 28 July to August, or during the latter part of the fourth week after emergence. After this, the rate of ncrease dropped rapidly, levelling off at about 3 August. The products of increases in height and n width showed that the rate of development of he potato was greatest during the fourth and fifth week after plant emergence. The products of photoraphic measurements of height and width of plants showed that, in 1950 and 1951, greatest growth occurred during the fifth and fourth weeks, respectively, after plant emergence.—From authors' summary.

184 CLAVER, F. K. Notas technicas. Factores que influyen en la incubacion de la papa. [**Technical notes. Factors which influence the incubation of potatoes.**] *Turrialba* 1953, **3,** No. 1-2, 32-4, bibl. 4. [Univ. Ciudad Eva Peron, Argentina]

The influence of temperature and photoperiod on the incubation period (the length of time between the sprouting of a seed potato and the first appearance of new tubers) was determined in an experiment on Katahdin potatoes. Low temperatures, between 4.7 and 8.8°C., retarded incubation. Exposure of the seed potatoes to natural light (10 hr. light and 14 hr. darkness per 24 hr.) for 30 days at the beginning of the test period reduced the time necessary for incubation. Prolongation of the exposure of the seed potatoes to natural light beyond 30 days retarded incubation.—W.J.B.

185 ALLISON, R. M. and DRIVER, C. M. **The effect of variety, storage and locality on the ascorbic acid content of the potato tuber.** *J. Sci. Fd Agric.* 1953, **4,** No. 8, 386-96, bibl. 22, illus. [Crop Res. Div., Dep. Sci. Industr. Res., Lincoln, New Zealand]

Tubers of 20 potato varieties grown at 4 centres in New Zealand were analyzed for ascorbic-acid content at harvest and at monthly intervals during storage in a commercial-type clamp, in 2 successive years; at one centre samples were taken prior to harvest. Ascorbic-acid content differed within varieties and between localities; the most northern centre, Pukekohe, where the soil was a volcanic loam, produced potatoes with a very much higher ascorbic-acid content than at other centres. In most cases, the rate of ascorbic-acid loss before harvest appeared to increase with the death of the haulm. The ascorbic-acid content rose consistently after approximately 5 months storage. The effect of changes in the ascorbic-acid content due to metabolic and temperature changes and the methods of sampling are discussed.—M.A.

186 THOMPSON, J. F. and others. **Investigations of nitrogen compounds and nitrogen metabolism in plants. 3. $\gamma$-aminobutyric acid in plants, with special reference to the potato tuber and a new procedure for isolating amino acids other than $\alpha$-amino acids.** *Pl. Physiol.* 1953, **28,** No. 3, 401-14, bibl. 28, illus. [Bot. Dep. Univ. Cornell, Ithaca, N.Y.]

[See also *Fld Crop Abstr.* 5 : 618 and 619.]

187 de WILLIGEN, A. H. A. and de GROOT, P. W. **Quick analysis of small samples of new**

**potato varieties.** *Pl. and Soil* 1953, **4,** No. 4, 377-83, bibl. 8, illus. [Exp. Sta. Potato Process., Groningen, Netherlands]

Notes are given on rapid methods of analyzing potato tubers for starch, N, P and soluble carbohydrate content, using the following determinations: specific gravity, refractive index of the press juice from rasped samples, conductivity and N content of the press juice. The separately harvested tuber yield of 5-10 stalks is used for analysis and an efficient saw-blade mill disintegrator is used for sample preparation.—P.J.B.

188 Crowther, E. M. **Fertilizer and other field investigations. Fertilizer placement [for potatoes].** *Rep. Rothamst. Exp. Sta. 1952* Harpenden, 1953, 39-40.

The results of experiments carried out at various centres in 1951 [See *Fld Crop Abstr.* 6 : 828] and in 1952, to determine the effect of different methods of applying fertilizer on the yields of machine-planted potatoes, are reviewed. In 1952, National Compound No. 1A (8% N, 6% $P_2O_5$, 10.5% $K_2O$) was applied at two rates, 7.5 and 15 cwt. per ac., by the following methods: (a) broadcast early and worked in deeply, (b) broadcast immediately before planting, (c) placed in contact with the seed and (d) placed in a sideband below the level of the seed. On the average of all experiments in 1952, placed fertilizer gave higher yields than broadcast fertilizer. There was no significant difference in the yields obtained by broadcasting at different times. At both rates of application in 1951, and at the lower rate in 1952, placement in contact with the setts gave higher yields than placement in sidebands. In 1952, at the higher rate of application, contact-placement gave yields lower than those obtained by sideband-placement on light soils while on heavy soils both methods gave equally good results. There is a risk that contact-placement may be less effective than sideband-placement on light soils and in dry summers.—W.J.B.

189 Verona, O. and Benvenuti, A. **Comparative effects of sodium nitrate and calcium nitrate on the potato.** *Pl. and Soil* 1953, **4,** No. 4, 298-302, bibl. 6. [Pl. Path. Inst., Univ. Pisa, Italy]

In 2 sets of trials in which applications of 120 kg. N per ha. either as sodium nitrate or calcium nitrate, in combination with nil, 125 or 250 kg. $K_2O$ per ha., were made to potatoes, analysis of the stems and leaves showed that the Na salt resulted in considerably greater uptake of Na, K, Ca and Mg than did the Ca salt, where no K was applied. Tuber yields, in most cases, were higher following Na treatment than following Ca treatment both with and without combined K treatment.—P.J.B.

190 Payne, Merle G. and others. **Protein content and specific gravity of Red McClure potatoes increased by 2,4-D treatment.** *Amer. Potato J.* 1953, **30,** No. 2, 46-9, bibl. 16. [Colorado Agric. Exp. Sta.]

Treatment of growing Red McClure potato plants with 2,4-D at a rate of 0.5 lb. per acre produced tubers of significantly higher protein content and significantly higher specific gravity.—From authors' summary.

191 Mattingly, G. H. **Storage of table potatoes. "Pitting"—sprout prevention.** *J. Dep. Agric. Vict.* 1953, **51,** Pt. 8, 362-3, illus.

Practical details of the method of above-ground storage of table potatoes in pits are given. Advice is given on the correct selection of potatoes, the size of heap and measures for protection against wet and frost. The use of a 2.4% solution of isopropyl phenyl carbamate is stated to have given good results in preventing sprouting in store.—M.A.

192 Ciferri, R. Inibizione della germogliazione di tuberi di patata e bulbi di cipolla a mezzo dell'idrazide maleica. [**Inhibition of sprouting in potato tubers and onion bulbs by maleic hydrazide.**] *Humus* 1953, **9,** No. 8, 13-14.

Trials in which stored potato tubers, either whole or cut in half, were sprayed with a 3% solution of maleic hydrazide, showed that this treatment did not inhibit sprouting, but appeared to have a fungicidal effect, especially on the cut pieces.—E.B.O.

193 Ciferri, R. L'isopropilfenilcarbamato e il naftalenacetato di metile come antigermogliativi di patate e di cipolle. [**Isopropylphenyl carbamate and methyl naphthalene acetate as sprout inhibitors of potatoes and onions.**] *Humus* 1953, **9,** No. 5, 12-14.

Results from trials indicated that a good treatment to prevent sprouting of potatoes is 100 mg. of IPPC, or, better, a mixture of 50 mg. of IPPC and 50 mg. of MNA per kg. of potatoes.—E.B.O.

194 White, Edna S. and Greenwood, Mary L. **The effectiveness of reduced dosage levels of activated carbon in counteracting the off-flavor in potatoes grown on soil treated with benzene hexachloride.** *Amer. Potato J.* 1953, **30,** No. 1, 6-9, bibl. 3. [Storrs Agric. Exp. Sta., Univ. Connecticut]

Whilst previous trials had shown that activated carbon applied at the rate of 1 ton per acre to soil treated with BHC counteracted off-flavour in potatoes, in these trials activated carbon at the rates of 10, 50 and 100 lb. per acre did not eliminate the off-flavour in potatoes grown in soil treated with BHC at 2, 2.5, 4, 7.5 and 37.5 lb. per acre up to 4 years earlier.—E.B.O.

95 Wilson, A. R. and Dawson, J. A. **Residues of tetrachloronitrobenzene on ware potatoes.** *J. Sci. Food Agric.* 1953, **4,** 305-10, bibl. 13.

olarographic determinations have been made of esidues on ware potatoes treated in autumn with 0 lb./ton of 3% TCNB dust to reduce sprouting n the clamp. Results indicate that after normal ommercial grading and transport following 4-5 nonths' storage, concentrations of TCNB on tubers re likely to be about 2 ppm. When the storage eriod is increased to 6 months, a further reducion to approximately 1 ppm. is probable. The riginal concentration applied (134 ppm.) is reluced mainly by handling before and after clampng, but losses by evaporation have been shown to ccur during storage. Washing still further reluces residues and no TCNB was found in the lesh of peeled tubers.—From authors' summary.

96 Nylund, R. E. and Poivan, A. J. **The influence of variety and date of planting on the relative cooking quality of potatoes graded according to specific gravity.** *Amer. Potato J.* 1953, **30,** No. 5, 107-18, bibl. 11. [Minnesota Agric. Exp. Sta.]

## WEET POTATO

97 Singh, H. B. **Grow more sweet potatoes.** *Indian Fmg* 1953, **3,** No. 5, 24-7, illus. [Div. Bot. Indian Agric. Res. Inst., New Delhi]

n trials carried out in the Punjab, Uttar Pradesh, orth Bihar and at Bangalore, the yield of the hinese variety F.A. 17 White was compared with hose of numerous other varieties. In all cases the ighest yields were obtained from F.A. 17 White, hich was also notable for its high sugar content.—V.J.B.

98 Sherman, M. and Mitchell, W. C. **Control of sweet potato weevils and vine borer in Hawaii.** *J. econ. Ent.* 1953, **46,** No. 3, 389-93, bibl 3. [Hawaii Agric. Exp. Sta.]

This article is concerned with the control of *uscepes postfasciatus*, *Cylas formicarius eleganulus* and *Omphisa anastomosalis* on sweet pottoes.—E.B.O.

99 Mullin, R. S. **Control of sweet potato cracking by soil fumigation.** *Down to Earth* 1953, **9,** No. 1, 15, illus. [Virginia Truck Exp. Sta., Norfolk]

oil injections of DD and Dowfume W-40 [rates ot stated] made 2 weeks before planting sweet otatoes, resulted in crops containing an average f 26% nematode-cracked tubers, compared with 3.6% from untreated soil.—P.J.B.

## CARROT

200† Scheijgrond, W. Voederwortelen. 2. De teelt, de waardebepalende hoedanigheden en enkele voor de veredeling belangrijke correlaties. [**Fodder carrots. 2. Cultivation, quality and some correlations of importance in breeding.**] *Euphytica* 1953, **2,** No. 2, 157-60, bibl 1, English summary p. 160. [Inst Rassenonderz. Landbgewassen, Wageningen, Netherlands]

Notes are given on the extent and methods of cultivation, utilization, and the correlations between different characters in Dutch fodder-carrot varieties. Dry-matter contents and winter-hardiness are highest in wedge-shaped, deep-rooted varieties, which are difficult to lift. Varieties with cylindrical roots, such as Witte Uitkijker and Mollestaart have low dry-matter contents. Carotene contents range from an average of 1137 mg. per kg. dry matter in Flakkeese Stomppuntige (Flakkeese Blunt-pointed) with orange-red flesh, through Diepense, with a content of 299 mg. carotene and a light orange colour, down to Vogezische Kort Witte (Vogezische Short White), with a carotene content of 8 mg. per kg. dry matter and a white root. Carotene content was most closely correlated with flesh colour. The dry-matter content of the roots was not closely correlated with the refractive index of the expressed sap. The crude-protein content of the dry matter of the roots ranged from 6 to 10% and was not correlated with dry-matter content.—P.J.B.

201 Wijbrans, J. R. Voederwortelen. 1. De indeling en de beschrijving van het in Nederland geteelde sortiment. [**Fodder carrots. 1. The classification and description of the varieties grown in the Netherlands.**] *Euphytica* 1953, **2,** No. 2, 149-56, illus., English summary p.156. [Inst Rassenonderz. Landbgewassen, Wageningen, Netherlands]

Fodder-carrot varieties are grouped on the basis of root colour and shape. Varieties and types mentioned in the 28th Descriptive List of Field Crop Varieties are placed within their groups and described.—P.J.B.

# FIBRE CROPS

## COTTON

202 Ferguson, H. **Agronomic research on cotton in the Sudan Gezira.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 4, 241-66, bibl. 31, illus.

A review of the agronomic problems confronting the Gezira authorities and of field research schemes conducted over a number of years is given. The standard rotation evolved for a 40-feddan [1 feddan = 1.038 ac.] tenancy, contains more than 50% fallow, namely : 2 yr. fallow — 1 yr. cotton —1 yr. fallow — 1 yr. sorghum — 1 yr. *Dolichos lablab* (or 1 yr. fallow) — 1 yr. cotton. Nitrogenous fertilizers are applied at the rate of approximately 50 rotls [1 rotl = 0.99 lb.] N per feddan ; they are distributed on the fallow several months before sowing cotton, but, if possible, just before ridging is carried out. Cultivation preparation for cotton consists of ridging the land in one operation straight from the fallow, additional cultivation only being given for weed control. Given favourable conditions, heavy waterings (above 400 cu. m./feddan) give the best yields. The optimum watering interval in October and early November was 11 days increasing to a 14-day interval or even longer in the winter. Brief mention is made of the high salt content of Gezira soils and of the possible use of saltbush (*Atriplex* sp.) for absorbing excess sodium.—M.A.

203 KING, H. E. **The Empire Cotton Growing Corporation in Africa. 4. Northern Nigeria.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 4, 273-7.

The importance of the cotton crop in the agricultural economy of Northern Nigeria is emphasized and mention is made of the progress achieved in distributing seed of the new strain, Samaru 26 C, which is expected to give at least a 15% increase in lint yield per acre over the old Allen stocks. The use of phosphatic manures, seed treatments and insecticides in the early stages of multiplication should accelerate the building up of sufficient seed stocks of this new variety.—M.A.

204 DUCKER, H. C. **The Empire Cotton Growing Corporation in Africa. 5. Nyasaland.** *Emp. Cott. Gr. Rev.* 1953, **30**, No. 4, 278-82.

The introduction of a summer-cropping system for cotton by the imposition of a date (7 Jan. 1952) after which no cotton may be sown in respect of the 1952 growing season, resulted in a considerable increase in the yield of seed cotton per unit area and in an improvement in lint quality. The average output of seed cotton in the Lower River district in 1952 was produced by about one-third of the acreage previously sown. The variety C.L. 20 has shown promise of quality and is revealing itself as the equal of its parent, Crown Land Bulk, in yielding power.—M.A.

205 BIGI, F. Recenti sviluppi e prospettive della cotonicoltura in Somalia. [**Recent development of and prospects for cotton cultivation in** (Italian) **Somalia.**] *Riv. Agric. subtrop.* 1953, **47,** No. 7-9, 295-319, bibl. 5, English summary pp. 318-19.

206 HARLAND, S. C. **Some impressions of cotton in Chile.** *Emp. Cott. Gr. Rev.* 1953, **30,** No. 4, 267-72.

A brief description is given of the scope of experimental work on cotton in Chile, together with an appraisal of the potential cotton-growing areas there. Some of the problems confronting the establishment of a cotton industry in Chile are discussed.—M.A.

207 ROGANOVIC, B. I periodi critici del cotone rispetto alla pioggia e alla temperatura. [**The critical periods of cotton in relation to rainfall and temperature.**] *Riv. Ecol.* 1952, **2,** No. 3, 275-83, illus., English summary pp. 282-3.

Trials carried out at Skoplje, Macedonia, to study the development and yield of cotton in relation to climate, indicated that there are 3 critical periods in the life-cycle of cotton, 2 determined by rainfall and 1 by temperature. In the 30 days before flowering, cotton yield is adversely affected by drought, the drought equivalent during this period being 38 mm. of rainfall. During pollination, fertilization and seed-setting, cotton is adversely affected by an excess of rain, the equivalent of excess of rain being 34 mm. In the 20 days before the appearance of the floral buds, a low temperature can adversely affect cotton yield. The equivalent of thermal deficiency in this period is thought to be 19.7°C. (average).—E.B.O.

208 TAVERNETTI, J. R. and MILLER, H. F. **Mechanized cotton : effects of machine topping and use of defoliants studied.** *Calif. Agric.* 1953, **7,** No. 8, 3, illus. [Calif. Agric. Exp. Sta., Davis]

In 2-years' trials, there was little difference between hand-topped, machine-topped and untopped cotton in terms of picker efficiency, lodging and cotton yields of mechanically harvested cotton. During the second year, topping plants mechanically at a height of 46 in. significantly increased picker efficiency and reduced lodging, compared with untopped plants. In a trial where cotton did not reach heights sufficient to cause lodging, mechanical-topping at a height of 42 in. reduced yields, compared with hand-topped and untopped plants. Chemical defoliation of plants had little effect on picking efficiency, but decreased trash content and resulted in a higher grade of cotton.—P.J.B.

209 STANSBURY, M. F. and others. **Phosphorus compounds in cottonseed kernels ; influence of variety of cottonseed and environment.** *J. agric. Food Chem.* 1953, **1,** 75-8, bibl. 7.

Seven types of phosphorus compounds in 58 samples of cottonseed kernels were studied to determine the influence of variety and environment. The influence of environmental factors are statistically more significant than the influence of varietal factors.—J.S.

10 DUFFIELD, P. C. and others. Enfermedades del algodonera en la Comarca Lagunera, México. [**Diseases of the cotton plant in the Comarca Lagunera, Mexico.**] *Foll. Divulg. Sec. Agric., Mexico.* 1953, No. 12, pp. 42, illus., English summary pp. 41-2.

he possible causes and the control of 3 diseases of ne cotton plant are discussed, namely, damping-ff caused by *Rhizoctonia* sp., wilt caused by *erticillium albo-atrum*, and Texas root-rot caused y *Phymatotrichum omnivorum*. The most effective ontrol for each of the diseases is crop rotation and oil improvement by the addition of organic naterial.—G.M.R.

11 DAVIS, D. W. and SESSIONS, A. C. **On the systemic action of Systox on cotton.** *J. econ. Ent.* 1953, **46,** No. 3, 526-7. [Calif. Spray-Chem. Corp.]

n account is given of trials conducted to study ne mode of action of Systox in controlling spider ites (*Tetranychus bimaculatus* and *T. pacificus*) n cotton.—E.B.O.

12 ROBERTY, G. Gossypiorum revisionis tentamen. [**An attempt at revision of the genus *Gossypium*.**] *Candollea* 1950-2, **13,** 9-165, bibl. in text.

n this third part of the work, which includes a eneral revision of the first 2 parts [see *Fld Crop bstr.* 1: 860], the subject-matter is treated nder the following heads: limits and major subivisions of the genus *Gossypium*, the wild cottons, . *arboreum*, *G. hirsutum*, *G. barbadense*, *G. lapideum*, ne unstable forms of *G. hirsutum* × *G. barbadense*, nd the "artificial" cottons. This last group inudes new forms obtained by artificial hybridizaon or colchicine treatment. The work is comleted by tables for the determination of the interpecific subdivisions of the 3 great species of cultiated cottons (*G. arboreum*, *G. hirsutum* and *G. arbadense*), indexes of vernacular names, synnyms and scientific names.—E.B.O.

13 STEPHENS, S. G. and FINKNER, M. D. **Natural crossing in cotton.** *Econ. Bot.* 1953, **7,** No. 3, 257-69, bibl. 12, illus. [N. Carolina Agric. Exp. Sta., Raleigh]

mong aspects considered are: the significance of atural crossing and methods for estimating the egree of natural crossing in cotton, including the se of isolated, open-pollinated populations, segreting for several marker genes and methods of timating effective bee (*Bombus* spp.) populations. Vith regard to the last, a method for estimating ne ratio of the number of bees to the number of owers in a given area, using methylene blue dust, described. Effective bee populations were lowest the peak period of flower production. Bees khibited a preference for *Gossypium hirsutum*, as gainst *G. arboreum*.—P.J.B.

214 EATON, F. M. and ERGLE, D. R. **Relationship of seasonal trends in carbohydrate and nitrogen levels and effects of girdling and spraying with sucrose and urea to the nutritional interpretation of boll shedding in cotton.** *Pl. Physiol.* 1953, **28,** No. 3, 503-19, bibl. 25. [Texas Agric. Exp. Sta., College Station]

Experiments carried out in 1947 and 1948 were designed to establish the extent to which nutritional relations in the cotton plant, as influenced by carbohydrate and nitrogen supplies, affected boll shedding. The investigation included chemical analyses of plants which were girdled and those sprayed with sucrose and urea in various combinations. Neither the relative number of bolls carried by a cotton plant, nor the percentage of bolls shed would appear to be influenced by the level of carbohydrate or nitrogen supply, but the absolute number it may develop was so affected. It is suggested that boll shedding is controlled by the balance between auxin produced in the leaves and an anti-auxin, or inhibitory material, moving out into the fruit branches which prevents boll development.—M.A.

215 LAND, W. B. and CARREKER, J. R. **Results of evapotranspiration and root distribution studies.** *Agric. Engng, St. Joseph, Mich.* 1953, **34,** No. 5, 319-22. [Georgia Agric. Exp. Sta., Athens]

Studies during 1952 are reported on the daily rates of evapotranspiration, yields and root distribution of tomatoes, pole beans, maize and cotton grown under irrigated and non-irrigated conditions on Cecil sandy loam soil in Georgia. Irrigation was applied when 25-35% of the available moisture remained in the soil. For irrigated cotton, the average daily evapotranspiration from 9 June to 26 August was 0.196 in. per day. The maximum rate of 0.31 in. per day occurred between 14 and 24 July. The average rate for non-irrigated cotton was 0.113 in. per day. For maize, the average daily rate of evapotranspiration was 0.22 in. from 10 June to 26 July, with a maximum rate of 0.28 in. per day. Seed-cotton yields from irrigated cotton were 2534 lb. per ac., compared with 742 lb. per ac. for non-irrigated cotton; respective grain yields of maize were 70.1 and 10.6 bu. per ac. With maize, 82% of the roots of irrigated crops occurred in the top 6 in. of soil, while in non-irrigated crops, this figure was 86%; for cotton, respective figures were 55.7 and 73.2%. In the 6-12 in. soil layer, respective figures for maize were 12 and 7%, and for cotton, 24 and 13%. The relatively larger proportion of cotton roots in the soil below 6 in. indicated that larger volumes of irrigation water might be applied to cotton at less frequent intervals than in the case of maize.—P.J.B.

216 COOPER, H. P. and others. **Effects of applications of sodium in fertilizer on yields and composition of the cotton plant.** *Soil Sci.* 1953, **76,** No. 1, 19-28, bibl. 14. [S. Carolina Agric. Exp. Sta., Clemson]

The results are given of trials over a period of 18 years, in which KCl and NaCl, either alone, or in combination, and $NaNO_3$ were applied to cotton. The average seed-cotton yields of crops receiving nil, 15, 30, 45 and 60 lb. $K_2O$ per ac. were 480, 859, 1146, 1262 and 1377 lb. per ac., respectively. In other trials, in which combinations of KCl and NaCl were applied, highest average seed-cotton yields followed treatment with the equivalent of 30 lb. $K_2O$ + 10 lb. $Na_2O$ per ac. Applications of 35 lb. $K_2O$ + 5 lb. $Na_2O$ per ac. produced yields of 997 lb. seed-cotton per ac., compared with 939 lb. per ac. where 40 lb. $K_2O$ per ac. were applied. No significant yield increases followed the application of more than 30 lb. KCl per ac., in combination with NaCl. Trials were carried out to determine the response of cotton to Na in 100 lb. $Na_2O$ per ac. applied as $NaNO_3$ in combination with nil, 15, 45, 60 lb. $K_2O$ per ac. When no Na was applied, average seed-cotton yields were 306, 742, 1093 and 1201 lb. per ac. where nil, 15, 45 and 60 lb. $K_2O$ per ac., respectively, were applied. Where these amounts of $K_2O$ were each combined with 100 lb. $Na_2O$ per ac., as $NaNO_3$, average yields were 521 943, 1280 and 1283 lb. per ac. The data showed that Na treatment was of relatively small benefit to cotton receiving adequate K. The slight yield increases in cotton yields following Na treatments at all levels of K application, indicated that Na may have a specific function in the cotton plant. The primary functions of alkali metallic nutrients in plants are discussed.—P.J.B.

217 LANCASTER, J. D. and others. **Influence of sodium on yield and quality of cotton lint and seed.** *Soil Sci.* 1953, **76,** No. 1, 29-40, bibl. 11. [Mississippi Agric. Exp. Sta., College Station]

In 25 field trials, the yield response of cotton to Na, combined with different levels of K treatment, was studied. In only 5 trials was there a response to K and in only 4, a response to Na. The greatest response to Na was obtained on soils with the greatest K deficiency. Where extreme K deficiency was present, the yield response to applications of 116 lb., or more, per ac. of Na equivalent was equal to that where 8-12 lb. $K_2O$ per ac. were applied. K treatments increased staple length, lint yields, fibre coarseness and uniformity of fibre length, but had little effect on fibre tensile strength. Na treatments slightly increased lint yield, but had no noticeable effect on coarseness of fibre, uniformity of fibre length, or tensile strength. When applied with K, Na had no effect on fibre characteristics. K treatments markedly increased the total and available oil content of the seed and also its germination percentage. Na considerably increased seed germination, slightly increased seed size and slightly reduced linter percentage, but had no other effect on the seed. Applied with K, Na slightly increased germination percentages, but had no other effect on the seed. Na had no effect on any characteristics of cotton fibre and seed that were unaffected by K. The role of Na in the nutrition of cotton is discussed.—P.J.B.

218 HALL, W. C. and others. **Studies on chemical defoliation and regrowth inhibition of cotton.** *50th Proc. Ass. Southern Agric. Workers, New Orleans, 1953* 175-6. [Texas A. and M. Coll., College Station]

In greenhouse trials during 1950-1, the addition of sucrose to defoliant sprays significantly increased defoliation in winter-grown, but not in spring- or summer-grown plants. Sucrose additions increased regrowth. Sprays containing 3000 ppm. maleic hydrazide, applied 14 days before defoliation treatment, increased the effectiveness of the defoliants and decreased regrowth. In trials in which a number of different compounds were applied to cotton 3 weeks before application of 2% monosodium cyanamide, or 1% Endothal, maleic hydrazide was most effective in inhibiting regrowth, though in some cases, better regrowth inhibition was obtained where maleic hydrazide was applied at the same time as the defoliants.—P.J.B.

## FLAX

219 WRIGHT, G. M. **A statistical study of linen flax crop records.** *Bull. 104. N.Z. Dep. Sci. industr. Res.* 1951, pp. 40, bibl. 19, illus. [Appl. Math. Lab., Lincoln]

A brief account is given of the organization of the linen flax industry in New Zealand, the areas used for flax, and the system of growing and buying the crop. Comparisons of numerous characters are made as between districts and the three seasons 1945-6 to 1947-8. The relations between the characters examined are discussed. In particular, time and rate of sowing, type of drill, previous crops, and rust infection are examined for their effects on seed and fibre yields and grade. A broad account of weather conditions over the period is given, and their relations with seasonal and locality variations in fibre production. Because of the irregular weather conditions in New Zealand it is considered impossible to produce fibre of a quality comparable with that obtained in western Europe. —M.A.

220 SIEBEN, J. W. **The correlation between resistance to lodging and fibre content in**

**flax.** *Euphytica* 1953, **2,** No. 2, 101-6, bibl. 14. [Pl. Breed. Found., Wageningen, Netherlands]

udies of data of fibre content and straw-stiffness ken from the results of inter-provincial trials th flax varieties in the Netherlands during 46-51, showed that there was a consistent gative correlation between stiffness of straw and re content.—P.J.B.

1 DORST, J. C. **Does the present trend to select for resistance to lodging in flax involve dangers of a loss in quality?** *Euphytica* 1953, **2,** No. 2, 96-100, bibl. 1. [Pl. Breed. Found., Wageningen, Netherlands]

idence is given to show that good resistance to lging in flax varieties tends to be associated with v fibre content.—P.J.B.

2 GREENHILL, W. L. **Harvesting flax crops in Australia.** *World Crops* 1953, **5,** No. 9, 375-7, illus. [Pl. Fibre Sect. Commonw. Sci. and Industr. Res. Org.]

ax crops in Australia are normally harvested by per-binder at the stage when the stems have t turned from green to yellow and when the ds have become firm and brown. It is estimated t the cost of harvesting by binder in Australia half that of harvesting by pulling machines. aping, compared with pulling, caused a loss of out 13% in fibre yield. It is possible, by careful paration of the soil, to facilitate closer cutting l thus to reduce fibre losses to 10% Providing stems are sufficiently long, reaped flax is easier handle before and during processing than pulled k. Abnormally short-stemmed crops when further rtened by reaping are of little value to the manuturer. Since exceptionally short-stemmed flax low commercial value and also lodged crops suitable for cutting by reaper-binder were often ndoned by farmers, methods of salvaging these ected crops were investigated. Harvesting the e seed with a combine harvester and baling the with a pickup baler was found to be the most mising method of dealing with lodged or extionally short crops. The unopened bales of straw were retted intact and subsequently d for the manufacture of tow.—W.J.B.

## MP

RAGAZZI, G. La raccolta e stagionatura della canapa. [**Harvesting and seasoning hemp.**] *Ital. agric.* 1953, **90,** No. 8, 563-8, illus.

methods used in Emilia, Italy, for harvesting seasoning hemp [*Cannabis sativa*] are debed. The crops are harvested at the end July to beginning of August, generally by chine. The precautions taken with hemp, after cutting and while drying in the field, to avoid rain damage and to obtain fibre of uniform colour are described.—E.B.O.

224 BARBIERI, R. La canapa in zona di bonifica. Nota 2. Il primo anno di esperienze con irrigazione nel Basso Volturno. [**Hemp on reclaimed land. Note 2. First year's trials with irrigation in the low Volturno.**] *Ann. Fac. Agr., Napoli* 1949-50, **18,** Ser. 3, 50-77, bibl. in text, illus. [Received 1953]

In the traditional hemp regions of Campania, Italy, hemp [*Cannabis sativa*] is generally grown without irrigation. The advantages of irrigating hemp were investigated in the reclaimed area in the low Volturno where rainfall is lower and the soil more compact than in the previous regions. The soil in the experimental field was more than 50% clay, very wet in winter and dry in summer. Hemp was sown on 31 March and irrigated by the furrow system. Although the results obtained are not considered conclusive, irrigation water in these trials resulted in a considerable increase in stem yields per unit area, as compared with yields without irrigation, but the corresponding increase in fibre yield per unit area under irrigation was somewhat smaller owing to a lower percentage of fibre in the stems. The fibre obtained under irrigation was also of a slightly lower quality. It is thought that these disadvantages could be eliminated by introducing suitable varieties and using different seed rates.—E.B.O.

225 JANNACCONE, A. Concimazione azotata e competizione delle piante fra loro in *Cannabis sativa* L. [**Nitrogen manuring and plant competition in *Cannabis sativa* L.**] *Ital. agric.* 1953, **90,** No. 3, 217-22, bibl. 4, illus.

Plot trials were carried out in Campania, Italy, to study the effect of different doses of N fertilizer on hemp yield. Results indicated that: (a) the application of N fertilizer considerably increased the fibre yields; (b) the higher dose of N manuring tested (90 kg./ha.) increased plant competition and, in consequence, the number of "suffocated" plants, a fact which is thought to influence adversely the quality of the fibre; (c) the dose of 40-50 kg. of N per ha. was the best with regard to both the quantity and quality of the fibre produced.—E.B.O.

## JUTE

226 COLONIAL PLANT AND ANIMAL PRODUCTS. **Jute from the Gold Coast.** *Colon. Pl. Anim. Prod.* 1953, **3,** No. 3, 239-42.

Samples of *Corchorus capsularis*, *C. olitorius*, and *C. olitorius* E.C.R. 576 were submitted to the British Jute Trade Research Association for examination. Fibre yields in lb. per acre were 330, 430 and 720, respectively. Details are given of sowing and harvesting procedures.—M.A.

227 Colonial Plant and Animal Products. **Jute from Tanganyika.** *Colon. Pl. Anim. Prod.* 1953, **3,** No. 3, 235-8.
Samples of *Corchorus olitorius* and *C. capsularis* were submitted to the British Jute Trade Research Association for examination. Fibre yields of the 2 varieties were 700 lb. and 220 lb. per acre, respectively. It is recommended that cleaner water be used for retting and that over-retting should be avoided.—M.A.

### KENAF

228 Manzano, T. B. **Influence of the rate of seeding on yield of fiber and seed and on quality of fiber of kenaf.** *Philipp. Agriculturist* 1952, **35,** No. 10, 561-7, bibl. 7. [Cent. Exp. Sta., Laguna, Philippines]
Rates of sowing used for kenaf (*Hibiscus cannabinus*) variety *viridis*, were 22, 34, 45, 56, and 67 kg. per ha., based on a germination percentage of 100. Plants were sown in rows 8 in. apart, with 2 in. between hills in the row. Sowing at rates of 22, 34, 45, 56, and 67 kg. per ha. gave average yields of 8.65, 7.14, 5.7, 5.49 and 4.86 g. dry fibre per plant and seed yields of 7.92, 7.72, 6.65, 5.83 and 4.23 g. per plant, respectively. Mean fibre yields varied directly with age at harvest. Plants 155 days old gave the highest mean fibre yields of 7.21 g. Fibre quality was best in plants harvested 127 and 134 days after sowing and was superior to plants harvested 141, 148, and 155 days after sowing. Rate of sowing did not significantly affect tensile strength of fibre. Plants 134 days old produced fibre with the highest tensile strength.—P.J.B.

## OIL CROPS

### SESAME

229 Berežanova, K. T. [***Sesamum indicum* var. Belosemjannyĭ M-7.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20,** No. 3, 70. [Turkmenian State. Breed. Sta.]
The history and characteristics of this variety are described. It was bred at the above Station (which serves the flood area of the lower and middle Amu-Darya) in 1936. In 1940 the variety was included in the State trials in Turkmenia when 2214 kg./ha. of seed were obtained (compared with 1836 kg./ha. from the standard variety Taškent 122).—M.H.

### LINSEED

230 Jenkins, B. C. **Oil seed crops. New developments and possibilities.** *Agric. Inst. Rev.* 1953, **8,** No. 5, 31-2 and 67, illus.
Notes are given on current progress and trends in work on linseed and safflower (*Carthamus tinctorius*) in Canada.—P.J.B.

231 Dillman, A. C. **Classification of flax [linseed] varieties 1946.** *Tech. Bull. 1064. U.S. Dep. Agric.* 1953, pp. 56, bibl. 39, illus.
Notes are given on the origin of linseed, together with descriptions of the different parts of the plant and a classification key to the different geographical or natural groups of varieties and strains. Descriptions, with notes on history and distribution, are given of: narrow-leaf linseed (*Linum angustifolium*), 3 varieties of dehiscent linseed (*L. usitatissimum crepitans*), 5 varieties of Indian common linseed (*L. usitatissimum*), 5 Mediterranean, 5 Argentinian, 2 Argentinian hybrids, 5 golden varieties, 2 winter, 2 Abyssinian and 22 North American varieties, together with 10 varieties of fibre flax.—P.J.B.

232 Cruickshank, I. A. M. and Jacks, H. **Seed disinfection. 7. Effect of seed treatments on emergence of linseed and linen flax.** *N.Z. J. Sci. Technol.* Ser. A., 1953, **35,** No. 1, 33-8, bibl. 2.
Eleven fungicidal treatments were used in preliminary glasshouse tests to determine the effect of seed treatment on emergence of linseed and linen-flax. Five of these, viz. Cuprox, Panogen, Ferbam, Thirodust and Phygon, were used in further emergence tests of three linseed and three linen-flax varieties in both glasshouse and field. Differences in the effects of treatments were similar for all varieties. Organo-mercury compounds depressed emergence in glasshouse tests. This result was confirmed in field tests for the one mercury compound (Panogen) used. Thirodust and Phygon, although depressing emergence in glasshouse tests, significantly increased emergence in field trials. Cuprox, in general, increased emergence but was not as effective as Thirodust and Phygon. Ferbam had little effect on emergence.—Authors' summary.

### SAFFLOWER

233 Palti, J. and Nizani, F. **Safflower growing in Israel.** *World Crops* 1953, **5,** No. 7, 266.
Large-scale trials to determine the suitability of safflower [*Carthamus tinctorius*] as a crop for various climatic zones of Israel were carried out by the paint-manufacturing industry. The seeds are sown in January-March and the crop harvested in

ly-August. Safflower can be grown on land tended for the sowing of winter cereals when nditions do not permit the timely sowing of the tter crop. Syrian seed, with an oil content of -30%, was used in the trials. Yields of 600-00 kg. seed per ha. were obtained in western alilee and the Mt. Tabor region where the annual infall amounted to 450-600 mm. In the arid gion, much lower yields were obtained.—W.J.B.

## APE

4 ANDERSSON, G. Svalöfs Regina vårraps II. [**Svalöf's Regina II summer rape.**] *Sverig. Utsädesfören. Tidskr.* 1953, **63,** 201-4, English summary p. 204.

note is given on the cultivation of summer rape *rassica napus* var. *oleifera* subvar. *annua*] in veden today. This has declined in recent years ving to the incidence of insect damage in south veden. It is held that cultivation of the crop in ntral Sweden should continue in view of the atively low incidence of insect pests there. Good sults have been obtained from crosses between nter and summer rape and from selection of raploid material. Data are given of seed yields Svalöf's Regina and Regina II (tetraploid) nmer rape at a number of locations during 45-52. In 124 trials, Regina II outyielded Regina an average of 4% in seed yields. Notes are given the characteristics of each variety.—P.J.B.

5 ANDERSSON, G. and TEDIN, O. Oljeväxtodlingen 1947-1948. [**Oil-seed crop cultivation (in Sweden) 1947-1948.**] *Sverig. Utsädesfören. Tidskr.* 1953, **63,** No. 3, 210-89, bibl. 5, English summary pp. 286-9.

e crops considered include: winter rape *rassica napus* var. *oleifera* subvar. *biennis*], nter turnip rape [*B. campestris* var. *oleifera* ovar. *biennis*], summer rape [*B. napus* var. *ifera* subvar. *annua*] white mustard [*Sinapis a*] and linseed. Statistical data for Sweden are en on each crop, including area under cultivan and yield, together with agronomic data, h as yields on different soil types, effect of N atment, date of sowing, seed rates and rowcings.—P.J.B.

BOVIEN, P. and LINDHARDT, K. Angreb af stengelaal (*Ditylenchus dipsaci*) paa raps. [**Attack of stem eelworm (*Ditylenchus dipsaci*) on oil-seed rape.**] *Ugeskr. Landm.* 1953, **98,** No. 18, 271-3, bibl. 5, illus.

Notes are given on a recent observation of stem eelworm attack on oil-seed rape in Denmark, with details of the damage caused to the rape plants by this parasite.—P.J.B.

## OTHER

237 JANNACCONE, A. Indagini sui rapporti di consociazione e di successione della senape nera. [**Investigations into the intercropping and succession of black mustard.**] *Ital. agric.* 1953, **90,** No. 5, 344-8. [Sta. Granicolt., Catania, Italy]

Black mustard [*Brassica nigra*] is grown on small areas in Sicily, generally intercropped with beans [*Vicia faba*], rarely with a cereal. Plot trials were carried out in 1951-2, in which the following 2 years' rotations were tested: (a) black mustard/wheat; (b) bean/wheat; (c) black mustard + bean/wheat; (d) fallow/wheat. From these trials it was concluded that black mustard should be grown alone and that wheat should not be grown after mustard. It was confirmed that beans are a valuable renovating crop before wheat, the wheat yields after beans being higher than after either black mustard or a fallow.—E.B.O. [Black mustard is grown in Sicily mostly for oil, the oil content in its seeds being 25-30%.—Ed.]

238 DANGOUMAU, A. and DEBRUYNE, H. Étude de la plante oléagineuse "*Lallemantia iberica.*" [**A study on *Lallemantia iberica,* an oil plant.**] *Oléagineux* 1953, **8,** No. 8-9, 567-79, bibl. 30, illus. [Lab. Munic., Bordeaux, France]

The general information given on *Lallemantia iberica*, an annual herbaceous species, includes botanical description, with notes on habitat and varieties. After a first attempt to introduce it into France, made by the Germans during the second world war with seed from Russia, cultural trials were carried out during the last few years in France and Morocco. These showed that this crop is of interest, especially for Morocco. Its seed yields 30% of oil, of the drying type. It is thought that the residual cake (protein content 30%) could be used for feeding animals. *L. iberica* is drought-resistant and is not exacting as to soil and cultivation. It can be grown as a catch crop, its vegetative period being 70-90 days. Under favourable conditions its seed yield is thought to be comparable with that of colza: under less favourable conditions it is comparable with that of flax.—E.B.O.

# LAND USE, SURVEYS AND MANAGEMENT

WELLINGTON, J. H. **Land use in Southern Africa.** *Fmr's Wkly, Bloemfontein* 1953, **85,** 14-17, illus.

A broad classification of the lands of Southern Africa is resolved into 6 groups: (1) intensive arable; (2) intensive pastoral; (3) semi-intensive arable and pastoral; (4) extensive pastoral and arable (including tsetse-infested areas); (5) ultra-extensive pastoral; (6) desert. The utilization and potentialities of these different areas are described. —M.A.

240 PICHI-SERMOLLI, R. E. **A report on the plant ecology of the arid and semi-arid zones of tropical East Africa. (Ethiopia, Somaliland, Kenya, Tanganyika).** 1952, pp. 108, bibl. 202, Paris; UNESCO.

A study of the climate, geology and pedology is included in this description of vegetation types in the arid and semi-arid zones of tropical East Africa. A list of the most important, useful wild plants in this area is grouped according to utilization.—M.A.

241 † FOSTER, E. E. **Potential utilization of the Kafue Flats of Northern Rhodesia.** *Geogr. Rev.* 1953, **43,** No. 3, 366-79, illus.

Notes are given on the climate, topography and potential agricultural uses of the Kafue Flats. Among possible agricultural uses of the region are: stock-raising on irrigated pastures, irrigated rice production in rotation with grass for winter grazing; and sugar-cane production.—P.J.B.

242 † LUCHINI, R. L'Argentina e la sua agricoltura. [**Argentina and its agriculture.**] *Riv. Agric. subtrop.* 1953, **47,** No. 4-6, 125-57, illus., English summary p. 157.

243 JAMES, P. E. **Trends in Brazilian agricultural development.** *Geogr. Rev.* 1953, **43,** No. 3, 301-28, illus.

A review is given of the pattern of land use and agricultural potential of different regions of Brazil, as influenced by climate and soil. The need is stressed for a transformation of the economic structure of Brazilian agriculture from the traditional system of quick returns, based on a minimum of expenditure, to a system of sustained output based on scientific agricultural practices.—P.J.B.

244 † GALINDO, G. B. Economía de producción agrícola en Colombia. [**The agricultural economy of Colombia.**] *Rev. Fac. nac. Agron. Medellin* 1953, **13,** No. 43, 1-204, bibl. 98. [Fac. Agron. Medellin, Colombia]

The agricultural regions of Colombia are described and an account is given of the economic importance of the chief crops and the extent of their cultivation. The grasslands and the cattle-rearing industry are also described. It is suggested that a thorough investigation of the economic geography, rural sociology and agricultural economy of the country is required before any notable increase in agricultural output can be obtained. The chief scientific and commercial institutes interested in the encouragement of agriculture and agricultural science in Colombia are described (pp. 176-93).—W.J.B.

245 † BARBIERI, R. Agricoltura sarda. [**Agriculture in Sardinia.**] *Ital. agric.* 1953, **90,** No. 4, 235-49, illus.

246 † WYATT, J. A. **The farming pattern of Kent.** *J. Brit. Grassl. Soc.* 1953, **8,** No. 2, 95-100, illus.

The versatility of agriculture in Kent can be attributed to the diverse geological formations of the Wealden district and the surrounding chalk. Brief descriptions are given of the different agricultural systems obtaining.—M.A.

247 SMITH, W. **The Merseyside District. The agricultural geography.** From: *A scientific survey of Merseyside* 1953, 289-99, bibl. 12, Liverpool; Univ. Press.

For the purposes of this survey, Merseyside covers south-west Lancashire, west and south Cheshire, north Cheshire and Wirral, and north-east Wales. The importance of agriculture in this region is illustrated by the statement that "even Lancashire, the very embodiment of vast sprawling industrialism, has more first-class agricultural land than land built over with factories and houses, and, of course, many times more good and medium quality land." The type of farming in this region is varied and includes market gardening for early or special crops on the coastal sandy soils and on the peat areas, arable cash crops on reclaimed peat and light loams in south-west Lancashire, dairy farming on the heavy loams of south and west Cheshire, mixed farming in north Cheshire and north-east Wales, stock-rearing in hill country, and sheep-farming on rough grazing land. The type which has developed depends largely on the soil, the supply of farmyard manure, availability of markets and, in recent years, Government policy expressed in subsidies and prices. The author shows the network of factors which have contributed to the foundation of the traditional type of farming in each area, the factors which have modified this traditional type, and the interdependence of one area on another. When writing of south and west Cheshire the author outlines the causes and results of "the erosion of farmhouse cheese-making by milk-selling", the former having declined considerably since 1934. (In 1949 only 26 farms made cheese while factory cheese-making increased.) The production of animal feed has changed accordingly from that required to produce high milk yields in summer only to a good all-the-year-round supply.—D.B.

248 PRICE, O. T. W. **Changes in the physical productivity of arable land in England and**

**Wales.** *Fm Econ.* 1952, **7,** No. 3, 108-16, bibl. in text. [Agric. Econ. Res. Inst., Oxford]

n index of the changes in the productivity of rable land in England and Wales has been contructed as a tool for the analysis necessary in aking proposals for increasing output per unit rea. The index is based on the crop years 1935 and 936, the average yield of which is given an index f 100. The yield index of each crop has then been eighted by its acreage to obtain a composite dex of productivity. The period covered is 1886-951, and the long-term trend appears to show hat the productivity of arable land has increased. he period 1937-51 is characterized by a fairly apid increase, which is considered to be due in rge measure to the more intensive use of fertilzers. Discussion of changes in high- and low-yield egions leads to the tentative conclusion that dvances in the science of arable crop production ave not benefited "productive" land any more han land of relatively low productivity in Engnd and Wales.—G.M.R.

49† RABINOVIČ, M. **[Distribution and specialization of agriculture in the Molotov Province.]** [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1953, **24,** No. 8, 29-41, bibl. in text.

he Molotov Province is one of the major industrial entres of the Ural area. [Molotov, formerly Perm, es in a limestone region characterized by karst ormations (sink-holes and underground caverns).] n account is given of the areas sown to different rops. Comparative figures show the extent of the own area (expressed as a percentage of the total owings) in 1940 and 1950. Grain crops declined rom 83% in 1940 to 76% in 1950 ; potatoes and egetables increased from 2.8% in 1940 to 4.5% in 950 ; flax declined from 2.5% to 1.7% and fodder rops increased from 11.7% to 17.6%. In spite of ome increases, food production is far below the equirements of the population. The Province as been divided into 3 zones : suburban ; flax rowing, and the grain production and animal usbandry zone. The agricultural economics peraining to these three zones are discussed.—M.H.

50† CAMBELL, K. O. **The conditions of increased productivity in agriculture.** *J. Aust. Inst. agric. Sci.* 1953, **19,** No. 2, 66-76, bibl. 17.

n comparison with the United States and Canada, ustralia shows a lower overall compound rate of ncrease in agricultural productivity during the ears 1951-2, and figures for productivity show a ecline in 1952 over 1951. The time lag which ccurs between new technical discoveries and their tilization by the farmer as well as the effect of uch technical progress on the individual farmer are iscussed. The provision of information, the clearer resentation of the economics involved in the adoption of new techniques and the impediments to the adoption of new technology on the individual farms are broadly reviewed. Other conditions for increased agricultural productivity are the need for adequate supplies of production requisites and the availability of cash or credit for investment. The government's role in raising productivity is mainly exercised through price and credit policies, tariffs and similar broad economic controls.—M.A.

251† LEWIS, A. B. **Land classification for agricultural development.** *Devel. Pap. No. 18. FAO* 1952, pp. 38, bibl. 16.

A review is given of the basic principles of the main types of land classification, including soil, land capability and economic land use classifications and the classification of major agricultural regions. The main emphasis is on the use of these types of classification for family-operated farms.—P.J.B.

252† STEPHENS, C. G. **Soil surveys for land development.** *Agric. Studies No. 20. FAO* 1953, pp. 110, bibl. 28, illus.

Among aspects considered are : the purposes and uses of soil classification and mapping, techniques of soil surveying and mapping, and the classification of soils.—P.J.B.

253 NYE, P. H. **A survey of the value of fertilizers to the food-farming areas of the Gold Coast. Pt. 1. Aims and methods of the survey.** *Exp. J. exp. Agric.* 1953, **21,** No. 83, 176-83, bibl. 4, illus.

Preliminary experiments at agricultural stations in the Gold Coast have shown that the responses expected from fertilizers are greatly influenced by the natural vegetation and cropping history of the land. Available N was more deficient in savannah areas than forest, and was particularly deficient on land freshly cleared from a long grass-fallow. Available phosphorus was more deficient in areas with a long cropping and short-fallow period, and responses were not so great on land that had received kraal manure. The main object of the survey was to determine the average fertilizer responses of the principal crops in the main food-farming areas of the Gold Coast. Large numbers of trials of a standard design were laid down in peasant cultivators' fields and the responses obtained correlated with the varying conditions of cropping, manuring, etc., that were found. In this part the geographical setting of the areas and the methods and organization of the survey are described.—M.A.

254 BEEKOM, C. W. C. van and others. **Reclaiming land flooded with salt water.** *Neth. J. agric. Sci.* 1953, **1,** No. 3, 153-63, illus.

Controlled experiments and field experience in the Netherlands have shown that the maximum concentration of salt in the moisture of the 5-20 cm. soil layers at which a given spring crop may be sown without risk of failure, varies from year to year according to the climatic conditions prevailing in the summer. Crops which succeed in a normal season when sown at a given salt concentration in the soil moisture, may fail when a hot, dry summer follows a spring sowing at the same concentration. A table is presented showing the maximum spring salt concentrations at which various crops may be sown, under average Dutch climatic conditions, with a reasonable chance of success (i.e. of obtaining a yield at least 75% of normal). In general, the figures given coincide with those already quoted by C. van den Berg in " The reaction of crops to soil salinity " *Verslag. Landbouwk. Onderzoek.* 1950, Vol. 56, No. 16. The maximum salt-concentration permissible for the planting of fodder-potatoes is 3 g. of salt per 1. of soil moisture, whereas in the case of potatoes for consumption, owing to the deleterious effect of salt on eating-quality, the maximum concentration permissible at planting time is 1.5 g. per 1. It is pointed out that winter-sown crops such as cereals and oil-seed rape may be sown at much higher concentrations of salt in the soil-moisture than spring crops, because winter rains leach the salt from the soil and because crop plants are able to tolerate much higher concentrations of salt at winter than at summer temperatures. In cool weather, cereals can germinate at salt concentrations as high as 20 g. per 1.—W.J.B.

## FARMING SYSTEMS AND PRACTICES

255 CASTRO, F. S. de. Algunas efectos de las quemas sobre el suelo y las cosechas. [**Some effects of burning on soil and crops.**] *Bol. inform. Cent. Invest. Café Colombia* 1953, **4,** No. 41, 9-32, bibl. 27, illus.

Throughout the hot and temperate regions of Colombia, i.e. from sea level to an altitude of 2000 m., burning is a general practice, either for clearing waste land or virgin forest, for cleaning weed-grown stubble or fallow, or for regenerating grassland. It is also sometimes used above the 2000 m. level to destroy weeds, particularly Kikuyu grass [*Pennisetum clandestinum*]. The Government agricultural and forest advisers are strongly opposed to burning and legislation has been promulgated which virtually forbids it, but the Colombian farmers are firm believers in the practice and it continues as of old. The arguments for and against burning are listed, and 19 examples are cited from the literature, nearly all of which point to successful results obtained from burning grassland, forest, or crop land. Two years' experiments conducted by the Colombian National Coffee Research Institute are then described, in which the effect of burning on maize cultures was tested in the following treatments: A. natural plant cover cut down and burnt, maize sown; B. natural plant cover cut down and supplemented by an equal quantity of plant refuse, burnt, and maize sown; C. natural plant cover cut down, surface hoed and maize sown. The trials were sown with 5 replications in two places having slopes of 3 to 10° and 50 to 60°, respectively. Results are fully described and show that, in the 2 years, burning had no effect upon the micro- and macroscopic population of the soil (0 to 10 cm. layer) nor upon the nutritive value of the maize harvested. Burning increased the soil's content of interchangeable bases, the permeability and size of the stable aggregates. In the burnt plots, the losses of soil were 16% greater, and those of water 50% less, than in the unburnt plots. The yield of maize was appreciably higher in the burnt plots.—G.M.R.

256 CHRISTIANSEN, J. E. **Irrigation in relation to food production.** *Agric. Engng, St. Joseph, Mich.* 1953, **34,** No. 6, 400-6 and 410, bibl. 20.

The problem of the increasing pressure of world population on available food supplies is reviewed. The past history of irrigation in different parts of the world and the contribution it makes to existing food supplies, particularly in the USA, is discussed. —P.J.B.

257 SCHOFIELD, R. K. **Agricultural meteorology. Irrigation.** *Rep. Rothamst. exp. Sta. 1952* Harpenden, 1953, 34-5.

Sugar-beet, barley, early potatoes and grass, grown in rotation, were subjected in 1952 to irrigation treatments applied either in the period April-September or in the first or second half of that period and designed to restrict the soil moisture deficit to 1 in. during the period of application. All crops benefited to some extent from irrigation applied throughout the period. Early potatoes, receiving a single dressing of N, yielded 6 tons per ac. when unirrigated and 9.7 tons when irrigated from 28 April to 7 July. Sugar-beet, receiving a single dressing of N, yielded 47.1 cwt. of sugar per ac. when unirrigated and 57.7 cwt. per ac. when irrigated from 28 April to 29 September.—W.J.B.

258 KLINTWORTH, H. **The use of brak water for irrigation.** *Bull. 328.* (*Chem. Ser. 185.*) *Dep. Agric. S. Afr.* [n.d.], pp. 14, illus.

This bulletin is a practical guide to farmers on ocedures to be adopted when using brak (saline) ater for irrigation.—M.A.

9 WALTERS, M. M. **Water requirements of alluvial Karroo soil with reference to the minimum requirements of winter cereals under irrigation.** *Sci. Bull. 305. (Chem. Ser. 181.) S. Afr. Dep. Agric.* [n.d.], pp. 35, bibl. 8, illus. [Grootfontein Coll. Agric., Middleburg, C.P.]

om 1940-5, experiments were laid down on a avy, deep, alluvial clay loam, representative a large part of the irrigation soils of the arroo, to determine the actual quantity of water quired for the production of wheat and barley that area. The total water requirements, and so the irrigation programme, for wheat and barley e given. Recommendations are made for the igation of shallow, red Karroo soils.—M.A.

0 TAYLOR, J. A. **The relation of crop distributions to the drift pattern in south-west Lancashire.** *Publ. 18. Trans. Inst. Brit. Geogr.* 1952, 77-91. [Univ. Coll. Wales, Aberystwyth]

n account is given of the close correlation be- een cropping practices and soil-drift patterns on ree mossland areas in south-west Lancashire. ree types of drift soil predominate in this area: e mossland acid-peat soils, the Shirdley Hill sandy ls and the Boulder clays. The mossland soils predominantly under maincrop potatoes, oats d hay; wheat, brassica crops and good clover/ ss leys are rare. The Shirdley Hill sandy soils e under a more varied crop rotation than the ssland soils, with early crops, wheat, brassicas, ver/grass leys and maincrop potatoes prominent. e Boulder clay soils are predominantly under rmanent grass. The different factors influencing pping practices on the three soil types are dis- ssed in detail.—P.J.B.

1 SIM, J. T. R. **Crop rotations in the winter-rainfall area.** *Fmg in S. Afr.* **28,** No. 238, 250-2. [Stellenbosch-Elsenburg Coll. Agric.]

the higher rainfall districts such as Stellenbosch, arl, and Belleville, dryland lucerne, either alone in combination with subterranean clover, has n introduced successfully into the grain rota- n. In these areas, however, there has been a adily increasing incidence of take-all or rotpootjie' in cereals; oats, though capable infection, are not liable to such severe damage wheat or barley. When growing wheat and barley rotation with lucerne, the best method of re- ing Vrotpootjie is to allow as long as possible ween the ploughing in of the lucerne and the ing of the grain. The place of lucerne and lupins the rotation is discussed and suggested crop ations utilizing these two legumes are given.— ..

262† MOROJELE, C. M. H. **The effect of Rhodes grass on crumb structure of sandy soils.** *Ann. Rep. Frankenwald Fld Res. Sta. 1952* 54-5. [Received 1953]

A comparison was made of the physical properties of samples of soil from arable land under, (a) a Rhodes-grass ley and (b) maize interplanted with cowpeas. Results showed that the percentage of water-stable aggregates in the soil from (a) was about 3 times as great as that from (b), indicating that the Rhodes grass induced a better soil crumb-structure than the maize and cowpeas. The percentage of organic matter from (b) was significantly greater than that from (a). This was probably due to the incorporation of plant material during composting. There was little difference in the soil reaction from the 2 treatments.—K.L.

263 de BOODT, M. F. and others. **Fall vs. spring plowing and soil physical conditions in a rotation experiment.** *Agron. J.* 1953, **45,** No. 6, 257-61, bibl. 20. [Iowa Agric. Exp. Sta., Ames]

The following rotations were used in a trial on Clarion loam soil over an 11-year period in Iowa: (a) maize/oats, oat straw removed, autumn ploughing, (b) maize/oats + undersown sweet clover (*Melilotus alba*), oat straw removed, autumn ploughing, (c) as for (b), but oat straw returned, (d) maize/oats, oat straw removed, spring ploughing, (e) as for (d), but a maize/oats + undersown sweet clover rotation. Maize yields over a 6-year period for treatments (a), (b), (c), (d) and (e) averaged 63.2, 69.7, 72.8, 60.4 and 66.4 bu. per ac.; respective average oat yields were 51.7, 54.8, 58.0, 49.8 and 57.6 bu. per ac. In one year only, autumn ploughing significantly increased maize yields compared with spring ploughing, though in all other years autumn ploughing resulted in slightly higher relative yields. Rotations which included sweet clover, with autumn ploughing, gave maize yields about 10% higher than those from rotations without sweet clover; the maize yield differences between these rotations where spring ploughing was used were smaller, but still apparent, compared with where autumn ploughing was used. Returning oat straw to the soil had no significant effect on yields.—P.J.B.

264† DABYKIN, V. P. [**Problems of developing agriculture in the far north.**] [Russian] *Priroda, Moskva* (*Nature, Moscow*) 1953, **42,** No. 4, 38-46, bibl. in text, illus.

From a review of experiments made on growing crops in the far north (68° N. lat. and beyond), it is concluded that the adverse effects of cold on crops result not only from the plants' difficulty in obtaining nutrients from cold soils, but also because the synthesizing activity of underground organs is restricted in cold regions. Means by which these difficulties may be overcome are put forward, and include : (1) the use of highly concentrated fertilizers (3 to 5 times that used normally in soils of temperate areas) ; (2) the application of micro-elements to stimulate absorption and utilization of nitrogen in the cold soils ; and (3) non-raidcal nutrition [supplying the plants with nutrients by means other than root absorption].—M.H.

## SOIL AND WATER CONSERVATION

265 SNEESBY, N. J. **Wind erosion and the value of shelter belts.** *Agriculture, Lond.* 1953, **60,** No. 6, 263-71. [Res. Unit, Agric. Land Serv., Eastern Prov., England]

Measures for the protection of the sandy soils and fens of East Anglia against wind erosion are discussed with reference to an equiry held by the Agricultural Land Service in 1951. The extensive cultivation of sugar-beet and other root crops on the fens is held responsible for the high incidence of cases of wind-erosion there because the fine seed-beds associated with such crops are particularly exposed to blowing. Since most blowing of soil occurs in March and April, the final preparation of seed-beds for roots is delayed, where possible, until May. Ley farming reduces wind erosion on sandy land but the system is unlikely to be introduced in the fens. An account is given of measures aimed at preventing wind erosion by binding the soil particles at the surface of ploughed land. Of these, the mechanical spreading of clay is considered the most effective measure on fen land. Different types of wind-break and their lay-out are described in detail. Strip-cropping, with belts of winter cereals to provide shelter for vulnerable crops, such as sugar-beet, and with strips of wind-resistant crops, such as temporary grass and kale, to act as a brake on wind-erosion over extensive arable areas, is advocated. The merits of belts of trees, hedges and earthen banks as wind-breaks on fens and on sandy land are discussed. In the fens, where land has a high value, belts of trees, which have to be 30 or more yards wide, are generally considered uneconomic. In the Breckland (sandy land) tree-belts are preferred to hedges which harbour rabbits. In the fens, the hedges investigated had an average ratio of sheltered distance to height of 27 while tree-belts 50 yards or more wide had an average shelter-to-height ratio of 14.—W.J.B.

266 GORRIE, R. M. **Aerial photography as an aid in planning improved land use and flood control.** *World Crops* 1953, **5,** No. 10, 405-8, illus.

The ways in which aerial photography can assist in solving the problems of water and soil conservation are outlined, with special reference to Ceylon. The detection of gaps in forest cover of catchment areas and of soil-creep on irrigated slopes, the preparation of fire-fighting schemes and the surveying of torrents, rivers and eroded areas are examples of tasks which can be eased by the use of aerial photography.—W.J.B.

## WEEDS AND WEED CONTROL

(See also under individual crops.)

267 ABEL, A. L. **Couch grass control with TCA.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain, 1953* pp. 5.

The selective and non-selective uses of TCA for the control of couch (*Agropyron repens*) were investigated. The results indicated that a satisfactory control of couch could be obtained by the application of 20-40 lb. per ac. of a 90% preparation of the sodium salt of TCA, applied in either low (20 gal. per ac.) or high (100 gal. per ac.) volumes of water. Used non-selectively, the higher rate of 40 lb. per ac. is preferable. As a selective herbicide, 20 lb. per ac. of 90% TCA can be used with little deleterious effect on sugar-beet (about 6 in. high) and linseed, but not on peas and beans.—W.J.B.

268† HOLMES, G. D. and BARNSLEY, G. E. **The chemical control of *Calluna vulgaris* Salisb.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain, 1953* pp. 7, bibl. 10.

Well-established growth of ling (*Calluna vulgaris*) was killed by the following sprays : (a) sodium chlorate at a rate of 160 lb. in 100 gal. water per ac., (b) ammonium sulphamate at 47 lb. in 100 gal. water per ac., (c) sodium arsenite at 35.5 lb. in 100 gal. water per ac., (d) 2,4-D isobutyl ester at 3.75 lb. in 160 gal. gas oil per ac. (e) 2,4-D at 3 lb. in 100 gal. diesel oil per ac.—W.J.B.

269 DADD, C. V. **Wild oats.** *NAAS quart. Rev.* 1953, No. 21, 1-7, illus.

A description is given of the main botanical differences between two varieties of wild oat, *Avena fatua* and *A. ludoviciana* and their field characters. The findings of a joint N.A.A.S. survey f the distribution and intensity of wild oats in ngland and Wales are briefly given. Infestation y wild oats of non-gramineous crops can be reuced by spraying with IPC and DNBP ; general ıethods of control include the use of a rotation hich, combined with cultivation, would prevent eeding taking place for at least 3 or 4 years.—.A.

70 THURSTON, Joan M. **Biology of wild oats. Germination and dormancy.** *Rep. Rothamst. exp. Sta. 1952* Harpenden, 1953, 68-9.

he experiments reported in *Fld Crop Abstr.* 6 : 59 were continued. Of the 2000 seeds fed to a alf bedded on peat in 1951, only 10 have so far erminated in the mixed dung and peat which was etained and kept in trays in a glasshouse. Seeds *Avena fatua* and *A. ludoviciana* were sown in eptember, 1952, in sand, sewage sludge, straw ompost, grass-mowings, peat, and in soils which ad consistently received one or other of various pes of manures in the past. By November, few eds of *A. fatua* had germinated. The percentages *A. ludoviciana* which had germinated by Novemer in various mediums were as follows : in peat 5 ; in sand 60 ; in soils 25-45 ; in organic aterials 1-35%. On the fields sown with wild ıts at different depths in 1950 and receiving aried cultivation treatments, more seeds of both ecies germinated in the shallow-sown than in the eep-sown (6 in.) plots. (In the previous year *ludoviciana* germinated best in the deep-sown ots.) Neither autumn nor spring ploughing of the eep-sown plots had any appreciable effect on the rmination of either species. Summer harrowing duced the number of seedlings appearing on allow-sown plots. So far only about 20% of the eds sown have produced seedlings.—W.J.B.

71 SALZMANN, R. Das Franzosenkraut (Galinsoga), ein lästiges Ackerunkraut. [**Galinsoga, a harmful arable weed.**] *Mitt. Schweiz. Landw.* 1953, **1,** No. 9, 136-40, illus.

description of the two closely related varieties *ulinsoga parviflora* and *G. ciliata* which are mmonly referred to as Galinsoga, is given. In cent years this weed has multiplied in the centre Switzerland. Control measures include hoeing d weeding before the plant can shed its seed. here infestation is very severe, the establishment a grass/clover ley is recommended.—M.A.

2 HODGSON, J. M. **Control of white top** (*Cardaria draba*) **by combined chemical, cropping and tillage methods.** *Proc. 13th Western Weed Contr. Conf. 1952* 9-12. [Received 1953]

*draba* was more effectively controlled by comned cropping, tillage and 2,4-D treatment than cropping or 2,4-D treatment alone. Stands of *C. draba* were reduced to 7% of the original after 3 seasons by combined cropping, tillage and 2,4-D treatment compared with a reduction to 60% of the original stands where plots were treated with 2 lb. per ac. 2,4-D amine or ester, only, each year. The best control practice with winter wheat was the application of 2,4-D in late April, when *C. draba* was in the bud stage, followed by ploughing 14 days later. Cultivations were then made intermittently until the sowing of winter wheat in October. 2,4-D was again applied in the following spring to the wheat crop. This practice reduced *C. draba* stands by 95% With maize, 99% control of *C. draba* was secured after 3 seasons of the following treatment : 2 lb. 2,4-D per ac. were applied in spring when *C. draba* was in the bud stage of growth ; 7-10 days later, the maize was sown and row-tilled twice before harvesting for grain. Where *C. draba* was allowed to flower and set seed before seed-bed preparation for maize, it subsequently competed very little with the maize crop.—P.J.B.

273 VOIGT, G. K. **The effect of Chlordane on the growth of chickweed** (*Stellaria media* (**L.**) **Cyrill**) **and purslane** (*Portulaca oleracea* **L.**). *Agron. J.* 1953, **45,** No. 6, 270. [Soils Dep., Univ. Wisconsin, Madison]

Notes are given on plot and greenhouse observations to determine the effect on germination and growth of chickweed and purslane receiving different amounts of Chlordane, with and without manurial treatment. In plot trials on coarse, sandy soils, these weeds grown on untreated soil produced an average of 98 g. fresh weight over a 3-week period, compared with 1004, 277, 37, 14 and 48 g. for plots receiving : (a) full manurial treatment, (b), (c) and (d) 10, 100 and 300 lb. actual Chlordane per ac., and (e) 300 lb. Chlordane per ac. + full manurial treatment, respectively. [Plot size is not given.] In greenhouse studies on the germination of chickweed and purslane seed, germination over a 6-week period was 30% for untreated soil and 25, 5 and less than 5% for plots treated with 10, 100 and 300 lb. Chlordane per ac., respectively. The possibilities of Chlordane treatment for control of both insect pests and weeds are noted.—P.J.B.

274 STOUT, G. L. and WAGNON, H. K. **Branched broomrape, *Orobanche ramosa* L., a pest of tomato and certain other crops.** *Bull. Dep. Agric. Calif.* 1953, **42,** No. 2, 45-51, bibl. 11, illus.

A list is given of reported host plants of branched broomrape. No satisfactory control of this species is known, other than the use of non-susceptible crops.—P.J.B.

275 JONES, K. W. **The witchweeds of Africa.** *World Crops* 1953, **5,** No. 7, 263-6, bibl. 13, illus.

Problems related to the eradication of three varieties of witchweed, *Striga asiatica*, *S. hermonthica* and *S. euphrasioides* are discussed. The appearance, life history and propagation of *S. asiatica* and *S. hermonthica*, both annuals and common parasites of field crops in Africa, are described in detail. The annual seed-production of an average plant, in both species, is 40-50 thousand. The seed, which remains capable of germination for a period of about 10 years, will not normally germinate except in the presence of the roots of certain plants, usually host plants. The young *Striga* seedlings develop underground for the first 4-6 weeks. Trap crops, such as sorghum or grasses, are commonly grown in S. Africa, to encourage the growth of *Striga* which is then ploughed in (before setting seed) together with the trap crop. In the Sudan Gezira, it was found that the legume 'lubia' (*Dolichos lablab*), although not a host to *S. hermonthica*, is capable of inducing germination of the seeds of the parasite, which, being unable to find a suitable host plant, dies. In Portuguese East Africa, cotton has been found capable of stimulating the germination of *S. asiatica* and the cultivation of cotton is therefore advocated as a means of controlling the weed. Irrigation of the soil can also be used to control *Striga*, since the seedlings are sensitive to water-logging. Varieties of sorghum differ greatly in their resistance to *Striga* spp. The sorghum variety Dwarf White Milo is outstanding among Sudanese varieties for its resistance to *Striga*. An account is given of the history of the chemical control of *Striga* spp. The application of MCPA or 2,4-D to the soil shortly after sowing sorghum crops, controls the growth of *Striga* sp. seedlings at the critical moment for the sorghum crop, while later applications of the hormone weedkillers control the growth of aerial portions of *Striga* and prevent it from seeding.—W.J.B.

276 Dadant, R. La lutte chimique contre les plantes envahissantes. [**The chemical control of weeds.**] *Rev. agric. Nouv.-Calédonie* 1953, **4,** No. 1-6, 31-2. [Inst. Fr. d'Océanie]

Advice is given on weed control in New Caledonia where the principal herbaceous weeds are *Ocimum gratissimum*, *Stachytarpheta indica*, *Sida rhombifolia*, *Indigofera suffruticosa*, *Verbena bonariensis* and *Solanum torvum*, and the principal noxious shrubs are *Lantana* sp., *Psidium guajava*, *Leucaena glauca*, *Acacia farnesiana* and *Mimosa invisa*.—E.B.O.

277 Herron, J. W. **Study of seed production, seed identification and seed germination of *Chenopodium* spp.** *Mem. 320. Cornell. agric. Exp. Sta.* 1953, pp. 24, bibl. 12, illus.

Descriptions are given of the seed of the following *Chenopodium* spp: *C. album*, *C. ambrosioides*, *C. berlandieri*, *C. bonus-henricus*, *C. botrys*, *C. capitatum* *C. glaucum*, *C. hybridum*, *C. murale*, *C. paganum*, *C. polyspermum*, *C. rubrum*, *C. strictum* and *C. urbicum*. Ten of these species are regarded as weeds in the northern U.S. and Canada. Data are given on the number of seeds produced per plant, 1000-grain weights and seed measurements. Studies are reported on the germination of the seed of 13 species. Almost all species exhibited dormancy. *C. berlandieri* appeared to be completely dormant immediately after harvest, whilst the proportion of dormant seeds in *C. glaucum* after harvest was very low. Dormancy in all species was broken by storage for 3-5 months under the following conditions: (a) moist sand at 3°C., (b) moist peat at 3°C., or (c) air-dry at room temperatures and (d) air-dry at 3°C. Seeds stored in moist sand, or peat, showed higher germination than those stored in air-dry conditions, though in the case of *C. glaucum*, *C. urbicum* and *C. murale* differences were slight. Seeds of all species germinated after being stored for 2 years at room temperatures in air-dry conditions. Seeds of *C. bonus-henricus*, *C. berlandieri*, *C. botrys*, *C. hybridum*, *C. paganum* and *C. strictum* germinated to different extents following storage for 3-5 months in moist sand or peat. Seed of the other species did not germinate under these conditions.—P.J.B.

278 Dadd, C. V. **Weed control in farm ditches.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain, 1953* pp. 6. [Nat. Agric. Advisory Serv., Eastern Prov.]

Studies carried out in 1952-3 on the control of weeds in farm ditches and small water-channels in the Fens are reported. Among the more successful chemicals tried were: (a) 2,4-D/PCP mixtures in gas oil, (b) emulsions of acid 2,4-D in gas oil and (c) mixed 2,4-D/2,4,5-T esters in oil. The degrees of susceptibility of various common weeds to these herbicides are tabulated. *Phragmites communis* was resistant to (b) and (c) and was only temporarily controlled by (a). Treatments (a), (b) and (c), applied in June, gave relatively clean ditch conditions in the autumn, except where the weeds were grasses, *Ph. communis* or *Carex riparia*.—W.J.B.

279 Kasasian, L. **A comparison of the effects of MCPA and 2,4-D on annual weeds.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain, 1953* pp. 7. [A.R.C. Unit of Exp. Agron., Oxford]

The results are reported of trials to evaluate the respective efficiencies of 2,4-D and MCPA amine, Na salt and ester for the control of a number of weed species. Low-volume (12 gal. per ac.) and high-volume (100 gal. per ac.) treatments were given, rates of application of each material ranging

n 0.2 to 2 lb. per ac. There was no significant
erence between the effectiveness of 2,4-D and
PA for the control of *Papaver rhoeas* and
*unculus arvensis*, and slightly less consistent
lence that there were no significant differences
he cases of *Atriplex patula*, *Matricaria* sp. and
*hanus raphanistrum*. 2,4-D was considerably
e effective than MCPA in the case of *Polygonum*
*icaria* and slightly more effective in the case of
*pis arvensis*. In the majority of cases, the
r form was the most effective, followed by the
ne and Na salt formulations. With *Sinapis*
*nsis*, 2,4-D Na salt appeared to be slightly more
tive than the amine. In the case of *Raphanus*
*anistrum*, the Na salts of 2-4,D and MCPA were
ificantly more effective than the amine formu-
ns.—P.J.B.

WOODFORD, E. K. **CMU, exploratory experiments under British conditions.** *Paper read at 1st Nat. Weed Contr. Conf., Gt Britain, 1953* pp. 7, bibl. 7. [Agric. Res. Council Unit Exp. Agron., Oxford]

eriments in Britain with CMU as a non-
tive and selective weedkiller are described.
experiments on land infested with weeds
inated by creeping buttercup (*Ranunculus*
*is*) and creeping bentgrass (*Agrostis stolonifera*)
hich CMU applied at rates of 20-60 lb. per ac.
compared with sodium TCA applied at 50-
b. per ac., TCA gave a better immediate
rol of weeds than CMU, but 11 months after
treatment, all weeds, including bindweed
*volvulus arvensis*), were killed on plots treated
CMU, whereas weed populations were re-
lished on plots treated with TCA. Two years
the application of CMU at rates of 35-60 lb.
ac., 50-60% of the area of the treated plots
ined bare of vegetation. Bracken (*Pteridium*
*inum*) was resistant to CMU. The detailed
ts of experiments in 1952 in which CMU
applied to numerous crops as a pre-emergence
y at rates of 0.125, 0.25, 0.5, 1, 2 and 4 lb.
ac. in aqueous suspensions applied at 50 gal.
.c. are tabulated and discussed. Good control
e weeds *Capsella bursa-pastoris, Chenopodium*
*n, Stellaria media, Melandrium alba* and
*io vulgaris* was obtained with CMU at 0.5 lb.
c. *Polygonum aviculare* was resistant at rates
ss than 1, and *Veronica* spp. at rates of less
2 lb. CMU per ac. The crops tested were
ed as follows into 5 categories of decreasing
ance to CMU ; (1) broad bean, maize, sor-
n, peas, sunflower, (2) vetch, buckwheat
y, (3) rye, linseed, wheat, rape, (4) cocksfoot
ne, oats, ryegrass, (5) red clover, white clover.
mount of CMU which could be applied to a
crop without causing a marked reduction in
varied from 0.125 lb. per ac. in the case of
in group (5) to 4 lb. per ac. in the case of group (1). There are brief notes on the use of CMU for the control of deep-rooted perennial weeds on land temporarily unoccupied by crops : at present, the persistence of the toxic effects of CMU used at the high doses required appears to preclude its use for this purpose.—W.J.B.

281 KNOWLES, G. **CMU for weed control in field crops.** *Proc. 6th Meet. Eastern Sect., Nat. Weed Cttee, Canada, 1952* 1953, 58-60.

Treatments of 20, 40, 80 and 100 lb. CMU per ac, were made to an area in May, 1951. Fifteen months later, none of 8 crops sown on parts of this area which received 40, or more, lb. CMU per ac. survived. Where 20 lb. CMU per ac. were applied, the growth of maize, lucerne and sugar-beet crops appeared normal, barley grew poorly and wheat very poorly; turnips and timothy (*Phleum pratense*) did not survive. CMU applied at 20, 40 and 80 lb. per ac. gave almost complete control of bindweed [*Convolvulus arvensis*], bladder campion [*Silene inflata*], curled dock [*Rumex crispus*], sow thistle [*Sonchus arvensis*], chicory [*Cichorium intybus*] and milkweed [*Asclepias* spp.]. In the case of bindweed and milkweed, 40 lb. CMU per ac. gave complete control. One year after this treatment, no regrowth occurred, except for milkweed, the regrowth of which died subsequently. In trials to control couch grass [*Agropyron repens*] with autumn treatments of CMU, ploughing immediately after autumn treatment with CMU caused less harm to maize sown the following spring than where the couch grass was undisturbed up to the time of seed-bed preparation for maize, or where the couch grass was ploughed up before CMU treatment. Five lb. CMU per ac. applied to couch grass in early May gave 70% control of the weed and did not harm maize sown 3 weeks later. Pre-emergence treatments of field crops with CMU appeared to be very risky on light sandy soils.—P.J.B.

282 MISRA, A. P. **Preliminary trials of some proprietary fungicides and weedicides in the field. 2. Weedicides.** *Pl. Prot. Bull.* 1952, **4,** No. 3, 64-5.

An application of 0.5% phenoxylene (containing MCPA), followed by a second application at 1% strength after one week, was sufficient to give complete control of young plants of *Carthamus oxyacantha*, a weed of cereals in Delhi State, India. Sprays at 1% strength gave unsatisfactory control of this weed in the advanced flowering stage. *Alhagi camelorum*, also a weed of cereals, was controlled in both the vegetative and the flowering stages by a single application of 0.66% phenoxylene. —W.J.B.

283 SHARP, S. S. and others. **Herbicidal use of phenyldimethylurea.** *Agric. Chem.* 1953, **8,**

No. 9, 56-7 and 139-43. [E. I. du Pont de Nemours and Co., Inc., Wilmington, Del.]
In field trials in Kansas, on plots heavily infested with field bindweed [*Convolvulus arvensis*], applications of 100 and 400 lb. phenyldimethylurea per ac. gave good control of this weed. In similar trials in California, 10 and 20 lb. phenyldimethylurea per ac. stunted field bindweed, while rates of 80 lb. per ac. completely controlled the weed. In Kansas, applications of 20, 30 and 40 lb. phenyldimethylurea per ac. gave 98, 99 and 100% control of quack grass [*Agropyron repens*], though rates of 60 and 80 lb. per ac. at another location were required to give complete control. In trials in Louisiana, applications of 80 lb. phenyldimethylurea per ac. in September gave 99% control of Johnson grass [*Sorghum halepense*] by the following May. Good control of Bermuda grass [*Cynodon dactylon*] and Canada thistle [*Cirsium arvense*] has also been secured by this material. Notes are given on the persistence of phenyldimethylurea in the soil and the relation between rainfall and herbicidal activity.—P.J.B.

284 DALLYN, S. **Herbicidal action of oils.** *Mem. 316. Cornell agric. Exp. Sta.* 1953, pp. 43, bibl 50, illus.
Experiments are reported on the characteristics of 10 pure petroleum hydrocarbon compounds and 3 commercial oils in relation to their herbicidal effects on a number of plant species, including carrots, beans and barley and on the nature of the tolerance to herbicidal oils shown by different species. Among the aspects considered were: the penetration, movement and distribution of oils in plants; the responses of plants to herbicidal oils; the effect of different environmental conditions at the time of spraying with oils; and the effect of certain conditions affecting cell permeability as related to the effect of the oils on the plants. The theory is advanced that the differences between the plant species studied in respect of their susceptibility to damage by herbicidal oils is due to inherent differences in the resistance of the cell cytoplasmic membranes to entry by petroleum hydrocarbons.—P.J.B.

285 MEADLY, G. R. W. **Crop spraying with hormone-like weed killers.** *J. Dep. Agric. W. Aust.* 1953, **2**, No. 3, 293-7, illus.
An account is given of the types and quantities of chemicals used. The results obtained are discussed. Problems peculiar to the application of sprays by aircraft are outlined.—M.A.

286 SISSINGH, G. Ethologische synoecologie van enkele onkruidassociaties in Nederland [**Synecology of weed communities of cultivated and waste land in the Netherlands.**] *Meded. Land Hogesch., Wageningen* 1952 **52,** No. 6, 1-206, bibl. 52, illus. [Pl. Geogr. and Bot. Lab., Agric. Coll., Wageningen]
The biological spectra of the various weed associations belonging to the phytosociological class Rudereto-Secalinetea (Braun Blanquet's classification) were determined according to Swickerath's method. In general, the constituent weed communities of the order Secalinetalia were dominated by winter annuals and were associated with crops sown in autumn or early spring while the constituent communities of the order Chenopodetalia were dominated by summer annuals and were associated with root crops sown in late spring. The adaptation of the best known weed associations in the Netherlands to various environmental factors including soil type, drainage, micro-climate, crop rotation and cultivation practices is described and illustrated with the aid of "flowering curves" for each association. A detailed account is given of the mode of dissemination of 20 weed associations. [See *Fld Crop Abstr.* 5: 571 for an account of Sissingh's earlier work on the subject.]—W.J.B.

## CROP BOTANY

287† LEFEBVRE, J. M. Les acides aminés chez les plantes fourragères et prairiales. [**The amino-acids of fodder and prairie plants.**] *Ann. Inst. Nat. Rech. agron., Paris. Sér. A. Ann. agron.* 1953, **4,** No. 1, 77-89, bibl. 47.
A bibliographical review describes the chemistry and method of determination of amino-acids in plant tissues.—M.A.

288 KENT, M. J. **An improved holder for seedlings in the *Avena* test.** *Science* 1953, **118,** No. 3060, 214-15, bibl. 1, illus. [Pineapple Res. Inst., Honolulu, Hawaii]
A note is given on the use of Lucite plastic racks for carrying out standard *Avena* tests of plant growth regulators. Holes are drilled in the top edge of the rack to hold the seedlings, while the bottom of the rack is placed in tap water. The racks allow the seedlings to be held more firmly, permit straighter shoot growth and save time in the selection of uniform rows, compared with the use of glass holders and wooden racks.—P.J.B.

289 MCRAE, D. H. and others. **Kinetics of auxin interaction.** *Pl. Physiol.* 1953, **28,** No. 3, 343-55, bibl. 14, illus. [Kerckhoff Biol. Lab., Calif. Inst. Technol., Pasadena]
It has been found empirically that the promotion

*lvena* coleoptile section growth by auxin can be ated quantitatively on the basis of the supposi- that the auxin molecule exerts its effect ough combination with a suitable receptor site hin the plant. The growth-promoting activity an individual species of auxin molecule can be racterized by two quantities, $K_s$ and $V_{max}$, h of which may be experimentally determined. describes the affinity of the auxin for the eptor site within the plant while $V_{max}$ is the wth response which obtains when all receptive s are saturated with the particular auxin. The ues of $K_s$ and of $V_{max}$ for chemically different tins are in general different. The principles ording to which chemically different auxins eract in promotion of growth of the *Avena* eoptile section appear to be largely understand- e in terms of classical enzyme kinetics. Although correctness of this formulation has been ified only for the *Avena* coleoptile, these same nciples may perhaps be applicable to further nt systems.—From authors' summary.

† VERONA, O. I microelementi nella nutrizione dei vegetali. [**The micro-elements in plant nutrition.**] *Industr. saccar. ital.* 1953, **46,** No. 3-4, 85-93, bibl. 50.

† Ø DELIEN, M. Mikronaeringsstoffer m.v. i jord- og plantekultur. [**Micro-elements, etc., in the soil and in plant cultivation.**] *Medd. norske Myrselsk.* 1953, No. 3, 69-83.

eview is given of the role of B, Cu, Mn, Fe, Mo, Mg, Se and Co in plant nutrition, with parti- ar reference to Norwegian conditions.—P.J.B.

2† HEWITT, E. J. **Experimental methods for the study of micronutrient deficiencies in plants grown in sand culture.** *Rep. agric. hort. Res. Sta., Long Ashton 1952* 193-5, bibl. 5, illus.

e also *Fld Crop Abstr.* 6 : 419 and 1187.]—M.H.

3† LAL, K. N. and SUBBA RAO, M. S. **Plant and animal nutrition. Role of copper in crop production.** *Trop. Agric., Trin.* 1953, **30,** No. 4-6, 76-81, bibl. 40.

eview is given of the results of research into the t played by copper in plant metabolism, the uence of copper deficiency on the growth and ritive value of plants and the means by which oper deficiency may be remedied.—W.J.B.

FORSTER, W. A. **Some effects of metals in excess on crop plants grown in soil culture : 5. Effects of copper on the mineral status of oat, rye, barley, sugar beet and kale.** *Rep. agric. hort. Res. Sta., Long Ashton 1952* 204-13, bibl. 3, illus.

, rye, barley, sugar-beet and kale plants were wn in soils treated with copper sulphate at various rates. In all crops, Cu application was associated with decreased dry weight, $K_2O$ and $P_2O_5$ contents, and increased Cu and Mn contents of the crops. Both CaO and MgO status increased with $CuSO_4$ treatment, though in oat and kale, CaO was increased only in roots, not in tops. An increasing supply of copper did not significantly change the Fe status of plant tops. The application of copper to barley and rye produced decreases in dry weights, and increases in copper and manganese status, which were similar in magnitude in the two crops.—Author's summary.

295 FORSTER, W. A. **Some effects of metals in excess on crop plants grown in soil culture : 6. Effects of cobalt and copper on mineral status of oat.** *Rep. agric. hort. Res. Sta., Long Ashton 1952* 214-18, bibl. 10, illus.

Details are given of a factorial pot experiment in which oat was grown in soil treated with copper and cobalt sulphates, both singly and in combination, at various rates. Copper and cobalt treatments decreased the dry weights of oat tops. They also produced symptoms of iron deficiency in the leaves and a reduction in the total iron status. A significant negative correlation ($P = 0.001$) was observed between the number of plants per pot showing iron deficiency symptoms, and their Fe status. Copper and manganese status of oat was increased by the application of Cu. The application of Co reduced the Cu content, but reduced Mn content at $Cu_0$ only.

The sum (Ca + Mg) content was increased, and K content was decreased, by the addition of either Cu or Co. Copper application reduced the P content of oat tops at $Co_0$, whereas cobalt application at $Cu_0$ had no effect. At $Cu_2$ and $Cu_3$, P status was greater when both Cu and Co were applied together, than when Cu alone was added. The effects of Cu on dry weights, and Cu, Mn, K, Ca, Mg and P status are similar to those observed in previous experiments. In the latter, however, iron deficiency symptoms were not produced, and no relationship was observed between copper application and the Fe status of treated plants.—Author's summary.

296† HEINEN, E. J. **Report on sodium in plants.** *J. Ass. off. agric. Chem., Wash.* 1953, **36,** No. 2, 392-7, bibl. 12. [Michigan Agric. Exp. Sta., East Lansing]

Notes are given on comparisons of the Perkin-Elmer flame photometric and the magnesium uranyl acetate procedures for determining the Na content of plant materials. Recommendations are given for improving the accuracy of the second method.—P.J.B.

297† PONS, W. A. and others. **An analytical system for determining phosphorus compounds in plant materials,** *J. Ass. off. agric.*

*Chem., Wash.* 1953, **36,** No. 2, 492-504, bibl. 26. [Southern Reg. Res. Lab., New Orleans, La]

Analytical procedures are given, including the reduced molybdate and isobutyl alcohol colorimetric methods, for determining the total P content of plant material, as well as specific methods for determining inorganic, acid-soluble, phosphatide and phytin P.—P.J.B.

298 KRETSCHMER, A. E. and others. **Effect of chloride versus sulfate ions on nutrient-ion absorption by plants.** *Soil Sci.* 1953, **76,** No. 3, 193-9, bibl. 10. [New Jersey Agric. Exp. Sta., Rutgers]

In studies on a number of plant species, including lucerne, red beet, lambsquarters [*Chenopodium album*], soyabeans and vetches [*Vicia sativa*] grown in pots on different substrates, variations in the $SO_4$ content of the substrate had little effect on the $SO_4$ content of the plants, or their absorption of other ions. Increasing the Cl content of the substrates increased the Cl content of the plants, irrespective of plant species, or substrate, up to a content of 10 me. Cl per l. of substrate. Increasing the amount of Cl in the substrates decreased the N content of 6 out of 10 plant species, including red beet and lambsquarters, in terms of me. per 100 g. plant material. This substitution of Cl for N did not significantly affect plant yields. Increasing Cl contents in the plants tended to decrease Ca and Mg content, though this was related to the K content of the plants. $Cl^{36}$ sprayed on to beet, wheat and rye plants was translocated both up and down the plants.—P.J.B.

299 TS'O, P. and STEINBAUER, G. P. **Effect of maleic hydrazide on auxin-induced water uptake by pea stem segments.** *Science* 1953, **118,** No. 3059, 193-4, bibl. 15. [Michigan State Coll., East Lansing]

Data are given of the water uptake of pea stems in relation to aeration, indoleacetic acid, maleic hydrazide and fumaric acid. From the results obtained, it is suggested that maleic hydrazide inhibits water uptake in the presence of indoleacetic acid by blocking the formation of fumaric acid and other essential metabolites.—P.J.B.

300 ANDREAE, W. A. and ANDREAE, Shirley R. **Studies on indoleacetic acid metabolism. 1. The effect of methyl umbelliferone, maleic hydrazide, and 2,4-D on indoleacetic acid oxidation.** *Canad. J. Bot.* 1953, **31,** No. 4, 426-37, bibl. 27. [Sci. Serv. Lab., Canada Dep. Agric., Univ. Sub-Post Office, London, Ontario]

It was concluded that 2,4-D, maleic hydrazide and methyl umbelliferone stimulate indoleacetic acid oxidation. It is suggested that these 3 substances may exert a growth-inhibiting action by causing excessive oxidation of indoleacetic acid.—P.J.B.

301 MITCHELL, J. W. and others. **Increased translocation of plant-growth modifying substances due to application of boron.** *Science* 1953, **118,** No. 3065, 354-5, bibl. 7, illus.

The translocation of 2,4-D in bean plants was considerably increased by the simultaneous application of boron, with or without sucrose. Boron also increased the rate of translocation of 2,4,5-T, 3-indoleacetic acid and alpha naphthaleneacetic acid. It was considered that the effect of boron was mainly to increase the rate of translocation of sugars and that the translocation of growth substances was increased as an indirect result of this.—P.J.B.

302 † RAVAZZONI, C. Azione di sostanze di crescita ed erbicidi sui sistemi enzimatici dei vegetali. [**Action of growth substances and herbicides on the enzymatic systems of plants.**] *Ann Fac. Agr., Milano, N. Ser.* 1952, **1,** 191-7, bibl. 11.

The effect of 2,4-D and some growth substances was studied on several enzymes of plants, among which were potato, rice and some weed species of rice. It was found that at low concentrations these substances influenced, either positively or negatively, the enzymatic activity, but that at higher concentrations they had a constant inhibitory effect.—E.B.O.

303 † SHIELDS, L. A. **Nitrogen sources of seed plants and environmental influences affecting the nitrogen supply.** *Bot. Rev.* 1953, **19,** No. 6, 321-76, bibl. 335.

This survey presents, in a condensed form, the present world knowledge on the nitrogen cycle and on the nitrogen requirements of a number of seed-bearing plants.—M.A.

304 GRANHALL, I. Köldhärdighetens växtfysiologiska grundvalar. [**The physiological bases of cold resistance in plants.**] *Nord. Jordbr-Forskn.* 1953, **35,** No. 1, 36-51, bibl. 38.

A review is given of the physiological bases of cold resistance in plants, with particular reference to winter wheats. Among topics considered are : the lower temperature limit of different plant species, the chemical and physiological characteristics of plant cells and tissues in relation to frost resistance, the process of ice formation in plant cells and its effect, the effect of thawing, genetically and cytologically governed factors for frost resistance and the most recent views on the process of winter-hardening in plants.—P.J.B.

305 † MÜNTZING, A. Polyploidernas ekologi. [**The**

**ecology of polyploids.**] *K. LantbrAkad. Tidskr.* 1953, **92**, No. 2-3, 119-30, bibl. 22, English summary p. 129.

he physiology of autotetraploid plant species in elation to their ecological possibilities is reiewed.—P.J.B.

06 Wahn, W. Kritische Studien zur ' Anwelkmethode'. [**A critical study of the ' wilting method'.**] *KühnArchiv* 1952, **66**, No. 1, 30-71, bibl. 25, illus., English, German, Russian and French summaries pp. 66-70. [Inst. Acker- u. Pflbau, Univ. Halle]

ee also *Soils and Fertilizers* 15 : 1263.] The ethod of using the measurement of the relative ranspiration of plants to determine their manurial equirements, and also to judge what effect different ultivation techniques exercise on the growth of e plant, is critically examined. This procedure, nown as the wilting method, is a means of etermining the relative transpiration of different lants and is briefly described. Preparatory to the ain trials, two experiments were carried out. In e first experiment it was demonstrated that the ifference in relative transpiration between winter arley plants, manured with PK and NPK, remained constant at both the 4-leaf and tillering ages and also remained constant at the 4-leaf and shoot-appearance stages when summer barley was manured with PK only. In the second experiment, it was shown that the optimum number of plants required to ensure a practical evaluation of relative transpiration in experimental work was 60. Trials at Lauchstädt and at Halle were analyzed to determine the relationship between relative transpiration and grain yield of summer barley and rye ; it was shown that the grain yield of summer barley varied in proportion to the relative transpiration of the plants. Applications of N raised the level of relative transpiration. The effect of legumes and cereals on an after-crop of rye was a reduction in the relative transpiration of the after-crop when the preceding crop was leguminous. A study of the relative transpiration of barley grown together with peas and vetches on poor soil manured with PK showed that the relative transpiration of barley was higher when grown with leguminous plants, due to their shade effect. Spring and winter barley sprayed with 2,4-D (U46) were damaged before tillering began, as shown by the increase of the relative transpiration, whereas, after tillering, little or no damage was caused. The results of these experiments indicated that the wilting method could be used as a practical test to determine the type and quantity of manure to be applied to crop plants.—M.A.

## MISCELLANEOUS

07 Belgian Congo. Institut National pour l'Étude Agronomique du Congo Belge. Bulletin climatologique annuel du Congo Belge et du Ruanda-Urundi, année 1952. [**Annual climatological bulletin of the Belgian Congo and Ruanda-Urundi, 1952.**] *Comm. 7. Bur. Climatol. INÉAC* 1953, pp. 144, illus. [Bruxelles]

08 Foss, H. Nattefrost og frostvern. [**Night frost and frost protection.**] *Nord. Jordbr-Forskn.* 1953, **35**, No. 1, 29-36.

brief review is given of past work on the measureent of heat radiation from the soil surface, leadg to frost, with notes on trials in Norway to test e effectiveness of artificial smokes and fogs in itigating such heat radiation.—P.J.B.

9† Ekstrand, H. Markvegetationens övervintringsproblem. [**The overwintering problems of field and pasture crops.**] *Nord. Jordbr-Forskn.* 1953, **35**, No. 1, 51-64.

review is given of the different modes in which inter injury is caused to field crops in Scandinia. Among topics considered are : fungous athogens, the combination of cold with dryingat of plants caused by wind, the effect of the health of plants on their cold resistance, waterlogging of plant roots, frost heaving and ice burn. —P.J.B.

310† Marinič, P. E. [**Varietal trials.**] [Russian] *Selek. Semenovod.* (*Sel. Seed-Gr., Moscow*) 1953, **20**, No. 4, 41-4.

An historical account is given of the organization of State varietal trials in the USSR, initiated in 1923/4. The paper comprises the work prepared for inclusion in the Agricultural Encyclopaedia which is being compiled.—M.H.

311 Nijhawan, S. D. and Kanwar, J. S. **Physico-chemical properties of earthworm castings and their effect on the productivity of soil.** *Indian J. agric. Sci.* 1952, **22**, Pt. 4, 357-73, bibl. 24, illus. [Govt Agric. Coll., Ludhiana, Punjab, India]

The physical structure and chemical composition of earth-worm castings from various Punjab soils were investigated. The results, which are tabulated, indicated that castings, irrespective of type and locality, contained more organic matter, total N and nitrate N than the parent soils. Large castings (from *Euthyphoeus waltoni*) contained more plant nutrients per unit weight than small castings

*Pheretima* sp.) and were notably richer in minerals than either the small castings or the parent soils. Pot experiments were carried out to determine the effect of mixing castings in various proportions with untreated soil on the growth and yield of wheat plants. Tillering, the number of leaves per plant and the grain yield per pot were increased by the addition of either type of casting to the soil. Small castings caused greater increases in plant growth than large castings. The mixing of small castings with the first foot of soil at a concentration of 20% caused greater increases of yield (up to 100%) than shallower applications at the same concentration or applications to the same depth (1 ft.) at lower concentrations. The more effective action of small castings on yield compared with large castings is attributed to the fact that the small castings contain a greater number of small-sized water-stable aggregates than the large castings.—W.J.B.

312 HARMER, P. M. and others. **Factors affecting crop response to sodium applied as common salt on Michigan muck soil.** *Soil Sci.* 1953, **76,** No. 1, 1-17. [Michigan Agric. Exp. Sta., East Lansing]

Trials during 1942-8, on organic soils with a pH of 6 to 6.2, are reported on the response of sugar-beet, peas and wheat to different K and Na treatments. Na was applied as common salt, or in K salts containing NaCl. A table is given in which the response of different field crops to Na, with or without K on organic soils, is summarized. Among crops with little or no response to Na, where insufficient K was present, were buckwheat, maize, potatoes, rye, soyabeans and sunflower. Crops with slight to moderate response to Na, where K supplies were insufficient, were lucerne, barley, carrots, millet, mustard [*Sinapis alba*], oats and vetch [*Vicia sativa*]. Crops with slight to moderate response to Na with adequate K supply were kale, peas, rape and wheat, while crops with a large response under these conditions were mangels, sugar-beet and turnips. Where drainage was good, response to Na tended to be better in wet than in dry years.—P.J.B.

313 TRUOG, E. and others. **Response of nine economic plants to fertilization with sodium.** *Soil Sci.* 1953, **76,** No. 1, 41-50, bibl. 9. [Univ. Wisconsin, Madison]

Laboratory and field studies are reported on the response of 10 crops, including sugar-beet, maize, barley, oats and potatoes to Na, applied with and without K. With sugar-beet, Na produced considerable response where available K supplies were low; with adequate K, Na treatment still produced increases in the yield and vigour of the crop. With barley, applications of 0 and 300 lb. NaCl per ac. on Miami silt loam resulted in grain yields of 26.5 and 40.8 bu. per ac. The barley received applications of 200 lb. 3-12-12 (NPK) in all cases. In trials on Superior clay loam soil, the mean yields of 8 varieties of oats were 73.5 and 77.2 bu. per ac., where nil and 300 lb. of NaCl were applied, respectively. The soil contained 266 and 28 lb. per ac. of exchangeable K and Na, respectively. Oats responded more than did barley to Na treatments. Results with potatoes were variable; yields of tubers were increased slightly by Na where moderate supplies of K were present. Where K supplies were either high, or very low, Na applications had little or no effect on tuber yields. Maize did not respond to Na treatments. It appeared that where crops respond notably to Na treatment, they would do so even where K supplies were ample. Where crops responded only slightly to Na treatment and K supplies were low, the response to Na in the presence of ample K was very low. Among the crops studied, sugar-beet and carrots responded notably to Na, oats and barley responded moderately, while potatoes and maize showed little or no response to Na.—P.J.B.

314 LARSON, W. E. and PIERRE, W. H. **Interaction of sodium and potassium on yield and cation composition of selected crops.** *Soil Sci.* 1953, **76,** No. 1, 51-64, bibl. 19. [Iowa Agric. Exp. Sta., Ames]

Studies are reported on: (a) the comparative effects of soil applications of Na and K, either alone, or in combination, on the yield and cation composition of red beet, flax, oats and maize and (b) the nature and degree of cation replacement in these crops in relation to their differential response to Na and K treatments. The crops selected were regarded as representing the maximum range of response to Na. They were grown on 2 soils, a Harpster silt loam with a pH of 8 and a Carrington loam with a pH of 5.7. Red beet appeared to use Na as a nutrient, its yields being raised by Na treatment, irrespective of the amount of K applied (up to 150 lb. per ac.). Flax and oats responded to Na only where no K was applied, indicating that Na acted as a partial substitute for K in these crops. Maize did not respond to Na. On the Carrington loam soil, over the range of Na treatments used (nil, 44 and 88 lb. Na per ac.), Na was 100, 40, 29 and 1% as effective as K in increasing the growth of red beet roots, linseed grain, oat grain and maize plants, respectively. Large differences in the ability of crops to absorb Na were evident; in the presence of large amounts of Na, maize plants contained less than 1 me. of Na, whereas red beet tops contained up to 161 me. per 100 g. dry matter. Red beet absorbed Na more readily than K. Oats absorbed K somewhat more readily than Na, while the uptake of Na by maize was almost nil. The total K + Na content of red beet showed a much higher correlation with root yields on both soil types than did K content alone.—P.J.B.

5 Cope, J. T. and others. **Effect of sodium fertilization on yield and cation content of some field crops.** *Soil Sci.* 1953, **76,** No. 1, 65-74, bibl. 11. [Cornell Univ., Ithaca, N.Y.]

ı greenhouse trials, maize and oats were grown on ardin silt loam receiving the following treatments er 2 million lb. soil; (a) no Na or K, (b) 200 lb. K, ) 118 lb. Na, equivalent to 200 lb. K and (d) 0 lb. K plus an equivalent amount of Na. K and a were added as chlorides. Maize plants were rvested at the tassel stage. Dry-matter yields ere significantly raised by Na, alone. Highly gnificant yield increases followed treatment with and Na + K. K produced significantly higher eld increases than Na, yields being increased .1% by Na and 27.9% by K, compared with ntrols. Oats responded highly significantly in rms of grain + straw yields to all 3 manurial eatments. The highest yield followed treatment ), though the difference between the results llowing treatments (b) and (c) were not signi- ant. Na treatment increased grain and straw elds by 55 and 31%, respectively, compared with ntrols. Maize yields were increased by Na, but ere was no correspondingly greater Na content in e plants, compared with controls. With oats, the aw accumulated large Na contents after Na eatment, with a corresponding decrease in and Ca content. The Na content of the aw was decreased by K treatments. The effect Na treatment on oat yields was attributed the substitution of K in the plant by Na. The ect of Na on maize was attributed to an increase K absorption from the soil in the presence of ı.—P.J.B.

6 Ripper, W. E. **Systemic insecticides.** *Paper read at 3rd Internat. Congr. Crop Protect. 1952* [n.d.], pp. 56, bibl. 227. [Pest Contr., Ltd., Cambridge, England]

nong topics considered are: the properties and aracteristics of Schradan, Hanane, Isopestox d Systox, and the fate of systemic insecticides in e plant.—P.J.B.

7 Dalenius, T. Något om metoder för objektiva skördeberäkningar. [**Some aspects of the use of objective methods for crop estimation.**] *K. Lantbr.Akad. Tidskr.* 1953, **92,** No. 2-3, 99-118, bibl. 11, English summary pp. 117-18.

A review is given of different objective methods for estimating crop yields, based on the formula: S = HPA, where S is the total crop yield, H the area of crop, P an index of the carefulness of harvest, and A the biological yield of the crop. Aspects considered are: plot size, shape, and location within the crop field and the so-called "bias problem," or the difficulty of ensuring that the crop samples taken for statistical treatment are a truly representative sample of the crop. Examples discussed include crop-yield estimations of wheat and potatoes. Two appendices are given, the first presenting a 3-stage sampling design for nation-wide surveys in Sweden and the second presenting a 3-year experimental plan for crop-yield estimations in Sweden using objective techniques.—P.J.B.

318 Frey, K. J. **The effect of cost functions on number of replications and samples per plot in field plot experiments of oats.** *Agron. J.* 1953, **45,** No. 6, 265-7, bibl. 8. [Michigan Agric. Exp. Sta., East Lansing]

Cost functions and empirical formulae developed by Smith [*J. agric. Res.* 1938, Vol. 21, pp. 1-23] for determining the optimum size of plot were applied to data from 6 oat trials to determine the optimum number of replications and samples per plot in order to obtain a degree of precision such that the standard error of the difference between the means of 2 varieties was equal to 6% of the general mean. It was found that cost per plot was about 3 times the cost per sample in the trials considered. The optimum whole number of replications per variety and number of samples per plot were 4 and 5, respectively. It is suggested that the values obtained for replication and sample numbers will depend on the degree of precision required, the heterogeneity of the test area and the ratio of cost per plot and cost per sample.—From author's summary.

319 Algeria. Gouvernement Général, Inspection Générale de l'Agriculture. La Station Expérimentale Agricole Régionale de Sétif. [**The Regional Agricultural Experimental Station at Sétif.**] 1952, pp. 16, illus.

An account is given of the organization and work of the Sétif Station, founded in 1936.—E.B.O.

320† Doidge, E. M. and others. **A revised list of plant diseases in South Africa.** *Sci. Bull. 346.* (*Bot. and Pl. Path. Ser. 16.*) *Dep. Agric. S. Afr.* 1953, pp. 122.

# BOOKS AND REPORTS

## BOOKS

Grist, D. H. **Rice.** 1953, pp. 331, bibl. 289, illus., London; Longmans Green and Co., 21 × 14 cm., 35s.

This comprehensive survey of the cultivation, harvesting and processing of rice in all parts of the world, the first since E. B. Copeland's "Rice" published in 1924, meets the needs of those who require a well-documented account of all aspects of the subject written in the light of recent research.

There is an important section on the botany of the rice plant in which the author examines the merits of the systems of varietal classification adopted in various countries and indicates the need for an internationally accepted system. There are also sections on the environmental requirements of the rice plant, traditional and modern methods of irrigation and cultivation, and on pests and diseases. The remainder of the book is devoted to : a description of methods of processing the harvested grain, the nutritive value of rice, and economic and social aspects of rice production with comparative data on production and yields in different parts of the world.

Throughout the book great stress is laid on the ways in which current methods of rice production and processing can be improved. More efficient irrigation and drainage, better control of pests and diseases, the wider use of manures and of improved varieties of rice are considered, in that order of importance, to be the chief means by which yields may be increased.

One of the most valuable chapters of the book to the agronomist is that on the application of fertilizers and manures to swamp and dry-land rice, in which the results of research up to 1951 are incorporated. In view of the often conflicting results of manurial experiments on rice, the author suggests that more fundamental research should be carried out on the correlation of soil types with yields and on the nutritional requirements of the rice plant.

The book is well illustrated and provided with a comprehensive index and a bibliography of 289 references.—W. J. Baulkwill.

322 GREAT BRITAIN. Commonwealth Bureau of Plant Breeding and Genetics. **New and promising varieties recently described in the literature.** (**8th issue.**) 1953, pp. 52, Farnham Royal ; Commonw. Agric. Bur., 25 × 19 cm., 6s. [Cambridge]

New and promising varieties of wheat, barley, oats, rye, rice, linseed, flax, millet, maize, sorghum, buckwheat, chickpeas, groundnuts, potatoes, sweet potatoes, peas and beans are listed with notes on origin, quality and field performance. The stations from which the seed of each variety can be obtained are named.—W. J. Baulkwill.

323† MCCONNELL, P. **The agricultural notebook** 1953, pp. 769, London ; Fmr and Stkbreed. Publ., Ltd., 15 × 10 cm., 35s.

McConnell's agricultural notebook is well known to farmers and agricultural students throughout Britain and the English-speaking countries. For more than 50 years it has found an honoured place on farmhouse and agricultural college bookshelves, in estate offices and public libraries. Whenever an essential fact about farming was required, this handy reference book was sure to be consulted and rarely failed to give the answer. The need for McConnell to-day is greater than ever, so complex and diverse has farming become. The new edition has been carefully revised and greatly enlarged under the editorship of Professor H. Ian Moore, with contributions from a team of authorities, including : Prof. H. Ian Moore (General Editor), J. Allison, G. H. Bates, J. R. Bond, Dr. A. H. Burgess, J. N. Craddock-Turnbull, R. H. Davidson, Dr. W. Davies, B. M. Dougall, Dr. Allan Fraser, Sir Cleveland Fyfe, G. D. Glynne Jones, J. P. Goodwin, Dr. R. F. Gordon, Dr. John Hammond, P. N. Harvey, David Hibbert, H. J. Hine, A. H. Hoare, D. P. Hopkins, Dr. Herbert Hunter, E. A. G. Johnson, W. C. Moore, Miss S. M. Nathan, J. B. Paterson, Dr. A. L. Provan, Dr. R. E. Slade, A. K. Spiers Alexander, Dr. I. Thomas, A. Thorpe, T. S. Wiltcher, and "Vet" of Farmer and Stock-Breeder Enquiry Service. For quick reference, a full index is included ; and there is a glossary of scientific terms and 208 tables.

The contents include: Weather; Soils; Drainage; Fertilizers and manures; Rotation of crops; Crops; Grassland; Hay, silage, dried grass; Fruit; Vegetables; Glasshouse crops; Diseases of crops; Insect pests of crops; Weeds and weed control; Breeding cattle; Rearing cattle for beef and milk; Artificial insemination; Breeds of horses; Breeding of horses; Breeds of sheep; Breeding of sheep; Breeds of pigs; Breeding of pigs; Feeding of livestock; Farm poultry; Animal health; Disease of poultry; Dairying; Beekeeping; Farm machinery; Farm buildings; Grain drying and storage; Labour; Farm accounts; Forestry; Agricultural legislation; Farm insurance; Mensuration; Ration tables; Monthly Farm Calendar.

324† UNITED STATES. Department of Agriculture. **Agriculture handbook No. 30. Manual for testing agricultural and vegetable seeds.** 1952, pp. 440, illus., Washington, D.C. ; U.S. Govt Printing Office, 23 × 14 cm. $4.

This manual was prepared by the Seed Act Division, Grain Branch, Production and Marketing Administration of the United States Department of Agriculture. It represents a concise summary of a wide range of technical information on seed technology, previously dispersed widely in various publications and is primarily intended to provide a means of instruction in methods of conducting seed tests, to give background knowledge on seed technology and to assist in reducing variations in the results of tests conducted in accordance with Federal and State seed laws in the USA. Among aspects considered are : seed sampling and testing equipment, procedures for determining purity, and the application of such procedures to the seed of different species, grouped by genera, procedures for determining germination and their application to specific genera, examinations for noxious weed seeds and tests for trueness of variety. There is an extensive illustrated section on the identification of seeds, together with information on the development, structure, hereditary characteristics and physiology of seeds. There are 16 pages of selected references to the literature on seed technology and a glossary of terms. An appendix contains rules in force in the USA for testing seed, together with procedures for determining germination percentages and hard seed content of samples of a large number of crop species and varieties. The manual is extensively illustrated.—P .J. Boyle.

325† McConkey, O. M. **Conservation in Canada.** 1952, pp. xiv + 215, Toronto-Vancouver ; J. M. Dent and Sons, Ltd., 24 × 17 cm., $3.50.

'An arresting fact for Canadians to consider is that Canada is one of the *last almost virgin areas of the world.*" Nevertheless, when men have had a go at Canada's virginity they have done the job pretty ruthlessly, though perhaps not more so than elsewhere. It is the old story of the unrestrained exuberance of youth, and we older peoples who have passed our climateric look on with envy at the re-enactment of our past excesses, and with sympathy tempered by superior wisdom when they have to be paid for. We know also that this raping of Mother Earth has its compensations in that it teaches lessons that jolt people back towards balanced land use after the imbalance that is natural and almost inevitable in early stages of human settlement.

In a series of short and pithy essays, Dr. McConkey describes the damage that has been done by the unplanned and uncontrolled exploitation of Canada's mineral, agricultural and forest resources, and how the damage can be repaired. The main damage has shown itself in the form of soil erosion, and the book is largely about the causes and control of erosion, but the integral conservation of all national resources is also touched on. The book is entirely non-technical and is written to draw public attention to the need for a comprehensive conservation policy, and to show what simple measures require to be adopted by land users to implement such a policy. Particular stress is laid on the importance of building up and maintaining the level of soil fertility by the use of manures, fertilizers, rotations, soil-building crops, etc., and especially on measures that maintain or increase the soil's humus content. A little too much contrast is made, possibly for propaganda purposes, between conservative European and exploitative Canadian agriculture, but there is little doubt that vast improvement could be made in the latter by adopting and adapting some of the basic principles of the former. Dr. McConkey packs a lot of material into a very small space, and wastes no words. Our chief regret is that he did not use more space. Half a page devoted to condemning the practice of straw burning, a page each devoted to contour cultivation, terracing and gully control, a page and a half to green manuring, three pages to rotations, four pages to barnyard manure, and eight pages to organic matter and soil fertility indicate the concentrated compactness of the book as well as the relative significance of its parts. But for anybody who wants to have a readable and well-illustrated review of the conservation problems confronting Canada and the ways in which they are being tackled the book can be highly recommended.—G. V. Jacks. [From *Soils and Fertilizers*]

326† Faulkner, E. H. **Soil restoration.** 1953, pp. 207, London ; Michael Joseph, 20 × 13 cm., 10s. 6d.

In *Ploughman's Folly*, his earlier book, the author gave an account of how he discovered that the mouldboard plough, which has served us so well in the favoured climate of Europe for many generations, may be a dangerous tool in certain regions of the U.S.A. where, he claims, dead weeds and other surface vegetation should not be ploughed in, but left on the surface of the soil to improve it and help to prevent erosion. He advocated a shallow cultivation system which he had developed on his small holding. This system was nothing new, but the story of his discovery was well told and his book created a great impression and had an enormous sale. In his latest book, *Soil Restoration*, Edward Faulkner propounds his theories, using an imaginary interlocutor who asks the sort of questions which give the author his chance to put over his simple philosophy—that of the successful farmer, who, unlike scientists and others, has discovered the truth. One would be more impressed by the book if it contained more facts, properly documented, and less dogma ; but one must admit that the dogma is well expounded and very readable.

327† Gardner, H. W. and Garner, H. V. **The use of lime in British agriculture.** 1953, xiv + 216, illus., London ; E. and F. N. Spon, Ltd., 21 × 14 cm., 26s.

Among the subjects treated are : the natural need for lime, the effect of the Land Fertility Scheme (1937), ways of detecting and measuring lime deficiency, methods of applying lime and the responses to lime of grassland and arable crops. There is a bibliography at the end of each chapter and an index.

328 Remington, D. S. and Francis, W. **The manure and fertilizer notebook.** 1953, pp. viii + 123, London ; Leonard Hill, Ltd., 22 × 14 cm., 12s. 6d.

This is the 4th edition of a practical guide to manuring. The subject-matter is likely to appeal to the smallholder and horticulturist. A helpful feature of the book is a chapter on analytical methods for the examination of soils and fertilizers, and a number of useful conversion tables. The role of trace elements and hormones in plant nutrition and metabolism is briefly outlined.—M. Akenhead.

329† ARLAND, A. and others. Magnesium—ein Pflanzennährstoff. Beiträge zur Frage der Magnesiumdüngung. [**Magnesium—a plant nutrient. Consideration of the question of magnesium manuring.**] [n.d.], pp. 216, illus. 13, Berlin; Deutsch. Innen- u. Aussenhandel, 21 × 15 cm.

This book is in the form of a collection of 11 separate articles which deal chiefly with the role of magnesium in plant nutrition. The importance of potassium and boron as fertilizers in association with magnesium forms the subject matter of some of the articles.—M. Akenhead.

330 ARLAND, A. "Fiebernde" Pflanzen—mehr Brot? Auf neuen Wegen zur Steigerung der Kulturpflanzenerträge. [**"Feverish" plants—more bread? New methods for increasing crop yields.**] 1953, pp. 80, bibl. 70, illus., Berlin; Akad.-Verlag, 27 × 19 cm. [Univ. Leipzig]

This work is an exposition of the concept that there exists in plants an optimum level of transpiration which corresponds to a normal temperature in human beings. Unfavourable environmental conditions and incorrect cultivation and manurial practices increase the transpiration rate above the normal level to the plant's detriment. The use of the wilting method to measure the relative transpiration of field crops is described in detail and examples are given of experiments which show a positive correlation between relative transpiration and crop yields as obtained when varying amounts of fertilizers were applied to crops. It is apparent that the author has investigated his subject thoroughly and produced convincing results from experiments conducted over a number of years. It is therefore disappointing that the subject matter is not treated with sufficient definition to enable the reader to select and digest easily the salient features of this study.—M. Akenhead.

331 LEITCH, I. and GODDEN, W. **The efficiency of farm animals in the conversion of feeding stuffs to food for man.** *Tech. Commun. 14. Commonw. Bur. anim. Nutr.* 1953, pp. 73, bibl. 10, Farnham Royal; Commonw. Agric. Bur., 25 × 20 cm., 5s.

## REPORTS

*The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.*

332 **Great Britain.** Rothamsted Experimental Station. Report for 1952. Harpenden, 1953, pp. 211, 7s. 6d.

INVESTIGATIONS REPORTED:

1. Irrigation experiments with sugar-beet, barley and early potatoes. By R. K. Schofield, pp. 34-5. [See Abs. 257.]
2. The effect of different methods of fertilizer placement on the yield of potatoes. By E. M. Crowther, pp. 39-40. [See Abs. 188.]
3. The effect of Krilium CRD-189 on yields of potatoes. By E. M. Crowther, p. 45. Small-scale trials were laid down on 13 farms in eastern England to determine the effect of treating soil at the rate of 600 lb. per ac. with Krilium CRD-189. The over-all average yields of 11.6 tons per ac. with the soil conditioner, and 11.2 tons per ac. without it, gave little indication that the crop benefited from applications of Krilium.
4. Uptake of nutrients from solutions sprayed on leaves of wheat and sugar-beet. By G. N. Thorne and D. J. Watson, pp. 66-8. [See Abs. 149.]
5. The germination and dormancy of wild oats. By J. M. Thurston, pp. 68-9. [See Abs. 270.]
6. Variation within species and the diagnostic value of seed characters of wild oats. By J. M. Thurston, pp. 69-71.
7. Effect of infection with beet yellows and beet mosaic viruses on the respiration rate of sugar-beet plants. By D. J. Watson, pp. 72-3. Infection with beet yellows virus increased the rate of respiration in the leaves and petioles of sugar-beet. The respiration-rate of the roots was unchanged. Infection with beet mosaic virus had similar but smaller effects.
8. Sugar-beet virus diseases. By F. C. Bawden, pp. 83-6.
9. The effect of insecticidal sprays on the spread of virus Y and leaf-roll virus in potatoes. By L. Broadbent, pp. 87-8. DDT, Parathion, Isopestox, Dieldrin and Toxaphene applied to crops of stock seed Majestic potatoes infected with the viruses, reduced the incidence of both diseases in the harvested plants. The results are tabulated.
10. Clubroot of cruciferous plants. By I. Macfarlane, pp. 89-90. The effect of various cropping treatments on the persistence of *Plasmodiophora brassicae* in the soil was tested. Growing cabbage, ryegrasses and poppies in infested soil reduced the subsequent infection of susceptible plants. Isolates of *P. brassicae* taken from cabbages grown in greenhouses and from swedes growing in the field were

found to differ widely in their capacity to infect various host-plants with club-root.

11. The control of eyespot (*Cercosporella herpotrichoides*) and take-all (*Ophiobolus graminis*) in wheat by the use of special rotations and sulphuric acid sprays. By M. D. Glynne and G. A. Scott, pp. 90-1. [See Abs. 24.]

12. *Gibellina cerealis*, a fungus disease of wheat. By M. D. Glynne, p. 91.

13. Fungicidal treatments of sugar-beet seeds. By C. E. Cornford, p. 92. Seed treatment with Panogen and with ethyl mercury phosphate (at 30 ppm.) gave significantly better emergence of sugar-beet seedlings than treatment with Agrosan.

14. Eelworm population changes and control of eelworm in potatoes. By B. G. Peters and others, pp. 95-9. Populations of potato eelworm (*Heterodera rostochiensis*) increased most rapidly in the period July-August. Applications of fertilizers to potatoes caused a significant rise in eelworm populations. Ammoniacal gas liquor applied at 9000 gal. per ac., caused a temporary depression, followed later by a marked increase, in the counts of eelworm.

15. The effect of lucerne and temporary grass on wireworm populations. By F. Raw and J. W. Stephenson, pp. 117-18. Starting from the small population resulting from 3 years' arable cropping, wireworm numbers can rise during 3 years under grass to a level at which damage to crops could follow ploughing up. The build-up of populations is considerably less under lucerne than under temporary grass.

16. Ley-arable experiments. By E. M. Crowther and others, pp. 135-7. The effects on succeeding crops of wheat and of various types of 3 years' ley were compared. On one field the wheat yields were highest after 3 years of arable cropping; on another, after a 3 years' lucerne ley.

17. Late nitrogen applied to cereals. By E. M. Crowther and others, pp. 140-1. Dressings of 1.5 and 3 cwt. of nitro-chalk applied to wheat, barley and oats when in ear, had little effect on yields in 1952. [See *Fld Crop Abstr* 6: 828.] The months June and July were too dry to permit any marked uptake of N from the nitrochalk.

18. Results of trials with maize. By H. H. Mann. pp. 152-3. [See Abs. 60.]—W.J.B.

333 **Great Britain.** First National Weed Control Conference, 1953. [The following papers were printed as separates before being read at the Conference.]

1. The cost of weeds and the potential value of herbicides in agriculture. By E. Holmes, pp. 17. Among topics reviewed are: the costs of weed control by tillage and herbicidal methods, and the benefits, in terms of yields and economic returns, of herbicidal weed control in cereal crops.

2. The effect of 2,4-D amine and MCPA sodium salt on clean cereal crops. By J. D. Fryer and J. G. Elliott, pp. 9. [See Abs. 111.]

3. The effect of various rates of application of 2,4-D amine salt and MCPA sodium salt on cereals. By J. L. Hunt, pp. 5. [See Abs. 53.]

4. Varietal susceptibility in oats to sterility and morphological abnormality induced by hormone-type herbicides. By E. B. Scragg, pp. 4. Trials are reported in which applications of MCPA and 2,4-D were made to 6 varieties of oats at 3 different growth stages. There was evidence of varietal differences in reaction to the herbicides. Plants of Milford and Yielder were considerably shortened by treatment, compared with Onward, Victory, Sun II and Star.

5. Abnormalities produced by early applications of MCPA and 2,4-D to cereal crops and their pre- and post-heading examination. By Marjorie H. Myers, pp. 4. Notes are given on the normal development of leaf and spikelet initials in wheat and barley, and their development as affected by herbicidal treatments. The technique of apex pre-heading examination is regarded as a satisfactory way of accurately determining the susceptible stages of cereals to 2,4-D and MCPA, and for early assessment of the results of field-spraying trials.

6. The practice of weed control by plant growth-regulating substances in cereals. By R. Pfeiffer and A. Zeller, pp. 4.

7. A comparison of the effects of MCPA and 2,4-D on annual weeds. By L. Kasasian, pp. 7. [See Abs. 279.]

8. The biological approach to the problem of wild oat control. By J. M. Thurston. Work on the botany of *Avena fatua* and *A. ludoviciana*, the dormancy of their seeds and the development and behaviour of wild oat plants in the field is reviewed.

9. Experiments with various pre- and post-emergence chemical treatments for weed control in sugar-beet. By C. Parker, pp. 7. [See Abs. 141.]

10. Recent developments in the control of weeds in forest nurseries. By G. D. Holmes, pp. 6. Preliminary reports indicate that spring applications of TCA at rates exceeding 120 lb. per ac. and CMU at rates over 20 lb. per ac. will eliminate persistent perennial weeds of fallow land such as *Agropyron repens* and *Agrostis* spp.

11. The chemical control of *Calluna vulgaris*. By G. D. Holmes and G. E. Barnsley, pp. 7. [See Abs. 268.]

12. Progress report on crop desiccating experiments in the United Kingdom 1952-3. By H. P. Allen, pp. 7. [See Abs. 123.]

13. CMU, exploratory experiments under British conditions. By E. K. Woodford, pp. 7. [See Abs. 280.]

14. Couch grass control with TCA. By A. L. Abel, pp. 5. [See Abs. 267.]

15. Observations on the application of 2,4-D and

MCPA weedkillers. By G. B. Lush, pp. 7. [See Abs. 113.]
16. Weed control in farm ditches. By C. V. Dadd, pp. 6. [See Abs. 278.]
17. The effect of type of ester and formulation on the phytotoxicity of 2,4-D herbicides. By K. Carpenter and M. Soundy, pp. 10. [See Abs. 112.]
18. The significance of weed seeds in relation to crop production. By F. R. Horne, pp. 25. Among aspects reviewed are : factors determining the presence of weed seeds in the soil when a crop is sown, factors affecting the behaviour of weed seeds in the soil, factors affecting weed populations in crops and the distribution of seeds produced by weeds in a crop and the control of the spread and multiplication of weed seeds.—W.J.B.

334 **Norfolk** Agricultural Experiment Station. 45th Annual Report 1952-53. Sprowston, Norwich, 1953, pp. 15.

Wheat. Time of sowing trials, pp. 6-7. Over 3 seasons, 1951-3, small plots of winter wheat were sown at the Norfolk Agricultural Station at dates varying from the beginning of March to the end of April. All winter wheats sown at the beginning of April eared well, although they did not all ripen.
Weed control in sugar-beet, pp. 8-10. Post-emergence and pre-emergence control of weeds in sugar-beet were investigated in 8 experiments on the farm. At rates of 250-400 lb. dissolved in at least 100 gal. water per acre, both sodium chloride and sodium nitrate gave satisfactory control of weeds at the post-emergence state. For pre-emergence control of knotgrass [*Polygonum* sp.], Endothal gave a good kill and CMU was most effective against chickweed ; both chemicals persisted in the soil.—M.A.

335 **Republic of Ireland** Department of Agriculture. Field Experiments, 1950. *J. Dep. Agric. Republ. Ire.* 1951-2, **48,** 193-229. [Received 1953]

INVESTIGATIONS REPORTED :
1. Winter wheat variety trials, pp. 193-5. Trials to compare Glasnevin Rosa with Pajberg were established at 22 centres in 11 counties. Rosa grew taller than Pajberg by an average of 6 in. at over 75% of the centres. At all but one centre, Rosa was the earlier variety in ripening by an average of 5 days.
2. Spring wheat variety trials, pp. 195-9. Trials were established with 3 varieties, Atle, Progress and Karn II at 65 centres in 26 counties. Karn II was the earliest ripening variety, and, at about 30% of the centres, was reported to be superior to the other 2 varieties, chiefly because of the larger size and plumpness of its grain. Atle yielded more per ac. than Progress and there was little difference in yield between Karn II and Atle.
3. Oat variety trials, pp. 199-202. A series of trials including Triumph, Bonster and Success X were carried out at 42 centres in 18 counties. Triumph gave a significantly higher yield than the other two varieties.
4. Trials with a combined Gammexane-organo mercurial seed dressing for control of wireworm and seed-borne diseases in cereal crops, pp. 204-5. Spring wheat and oat seed dressed at the rate of 10 oz. per barrel of a Gammexane-organo mercurial compound resulted in higher grain yields.
5. Trials with selective weed-killers, pp. 207-11. Concentrations of 1 and 2% solutions of MCPA and DCPA at the rate of 100 gal. per ac. were applied to stands of oat and spring wheat. At both levels, MCPA treatments increased the yield of oats and spring wheat.—M.A.

336 **France.** Institut National de la Recherche Agronomique. Rapport annuel 1949. [National Institute for Agricultural Research. Annual Report for 1949.] *Inst. nat. Rech. agron., Paris* 1950, pp. 163.

Cereal variety trials, pp. 95-9. Recommended varieties of wheat, oats, spring and winter barley and maize are given according to location.
Potato variety trials, pp. 99-100. At Colmar, the late varieties Voran and Ackersegen were superior to Ostbote and Industrie.—M.A.

337 **Switzerland.** Mont-Calme, Montagibert, Lausanne and Pully Federal Agricultural Stations. Rapport d'activité 1952. [Report of activities, 1952.] Berne, 1953, Pt. 1, 746 and 890

Cereal variety trials, pp. 791-3. Of 9 varieties of autumn wheat tested at 11 localities, the hybrids Cappelle and 783/47 gave the highest grain yields. Trials with 6 spring-wheat varieties at 3 localities resulted in the German variety, Lichti, outyielding the rest, being superior to the variety Huron in respect of early maturity and resistance to lodging. The spring-rye variety Carsten gave the highest grain yields of all other varieties tested at 5 localities. Of 9 autumn-barley varieties tested at Céry, the variety Engelen II gave the highest grain yields. The spring-barley variety Nordgaardens Carlsberg outyielded 9 other varieties tested at 3 localities. The French autumn-oat variety Noire du Prieuré gave, on average, the highest yields of 5 varieties tested at 3 localities. Flaemingsgold and Flamingstreue gave the highest yields of 7 spring-oat varieties tested at 3 localities.
Potato variety trials, pp. 795-6. At Chavonnay, Bintje, a medium-early potato, outyielded 5 other varieties tested. Of 5 medium-late varieties tested at Illarsaz, Erdgold gave the highest yields.—M.A.

338 **Algeria.** Gouvernement Général, Inspection

Générale de l'Agriculture. Rapport du Conseil de l'Expérimentation et des Recherches Agronomiques pour 1951-1952. [Report of the Council for Agronomic Experimentation and Research for 1951-2.] Alger, 1952, pp. 288.

VESTIGATIONS REPORTED :

Varietal trials with cereals, pp. 48-80. Notes
e given on varietal susceptibility to yellow berry
durum wheat.

Varietal trials with lentils, beans, chick-peas,
dney-beans (*Phaseolus* spp.), potatoes, hybrid
aize, rice, cotton, sugar-sorghum and sugar-beet,
. 80-91 and 106-23.

$CH_3Br$ and glycol monochlorhydrine were
und to break dormancy and to stimulate germina-
n in seed potatoes, p. 175.

Studies on toxicity of ergot-affected oats and
eat, pp. 199-200.

Susceptibility of the principal wheat varieties
own in Algeria to bunt (*Tilletia foetida*) and its
ntrol, pp. 211-25.

Control of covered smut (*Ustilago hordei*) on
rley, pp. 225-30.

Susceptibility of the principal barley varieties
own in Algeria to *Helminthosporium gramineum*
d its control, pp. 230-2.

Weed control, pp. 232-49. A table gives the
gree of susceptibility of different weed species to
rious herbicides tested. From preliminary
als it appeared possible to control bindweed
*nvolvulus arvensis*) on fallow land by treat-
nt with the ester of 2,4-D employed at the rate of
out 2 kg. of acid equivalent per ha.—E.B.O.

9 **Sierra Leone** Department of Agriculture. Annual Report for the year 1951. Freetown, 1953, pp. 25, 1s. 6d.

a fertilizer and dibbling trial with rice at the
ala training college farm, the application of
wt. per ac. each of superphosphate and am-
nium sulphate to Bundubai and *glaberrima*
rieties of upland rice, increased their yield by
rly equal amounts, namely 629 lb. [presumably
ddy] per acre. Dibbling gave higher yields than
adcasting. The highest total yield was from
bbled Bundubai rice, receiving fertilizers, which
ve 2081 lb. [presumably paddy] per acre.—M.A.

**Sudan Gezira Board.** First Annual Report 1950-1951. [n.d.], pp. 24, illus. [Received 1953]

is first report of the Sudan Gezira Board is
ided into 4 main sections. An introduction traces
history of the scheme and the main principles
derlying its operation. Two other sections dis-
s the management of the scheme and aspects
social development. Agricultural research is con-
cted on the Gezira Research Farm. A brief review
given of the main problems confronting the
ard, particularly the effectiveness of mechanization. A large-scale field trial with X1730.L.1, a blackarm-resistant strain of cotton, showed that this strain, when planted early, proved resistant to blackarm and gave a much higher percentage of top-grade cotton than did any other variety. The results of spinning tests from the Shirley and Giza Institutes from 1947-50 are given in an appendix. —M.A.

341 **Tanganyika Territory.** Empire Cotton Growing Corporation. Progress reports from experiment stations. Season 1951-2. Lake Province, 1953, pp. 14.

INVESTIGATIONS REPORTED :

1. Resting-crop trial, pp. 4-5. The effect on the first indicator crop of leaving land down to 'tumbledown' fallow, annual cropping and planted grass fallow showed over a period of 3 years that the tumbledown fallow, consisting mainly of *Tridax repens*, benefited both cotton and millet.
2. Trial to discover the optimum time to apply N to cotton, pp. 6-7. There was little difference between times of application from January to March.
3. The effect on sorghum yields of ridging, pp. 7-8. Sorghum planted on the flat and on the ridge yielded 190 and 469 lb./acre of grain, respectively.
4. Rotation trial, p. 8. The first cycle of 4 years of the Ukiri rotation trial was completed. Cotton following two years' millet yielded 140 lb. per ac. more seed cotton than when following any of the other crops in the trial. This effect was considered to be due largely to a reduction in secondary bacterial blight infection.
5. Cotton pests and diseases, pp. 12-14. On Ukerewe Island, cotton following cassava or fallow was much more vigorous and freer from bacterial blight than on land which had been carrying cotton for a number of seasons.—M.A.

342 RATTRAY, A. G. H. Agricultural Experiment Stations, Salisbury. Annual report of experiments. Season 1951-1952. *Rhod. agric. J.* 1953, **50,** No. 3, 195-212.

INVESTIGATIONS REPORTED :

1. Crop-rotation trials, pp. 198-202. The results from 3 series of crop rotations laid down in 1913, 1919 and 1926 are given. These were based, essentially, on different combinations of rotations of maize and legumes, together with varying amounts of artificial fertilizers and compost. Maize and velvet beans for hay grown alternately from 1915 without phosphates have given lower yields than maize grown continuously with phosphates. The full benefit from a green-manure crop was only obtained when phosphates were applied. Where maize and legumes for green manure were grown in rotation, the land was kept at a higher fertility level and the maize crop could be produced more economically if the interval between the green manure crops was reduced.

2. Maize and legume rotation trial (started 1939-40), pp. 200-2. The object of this experiment was to determine the effect on the yield of maize when a legume is grown in the rotation at varying intervals and used (1) for green manure, (2) for hay, (3) for seed production. The trial proved conclusively that the most effective method of using a legume to produce heavy yields of maize was to plough the whole crop under as a green manure.
3. Maize spacing trial, pp. 202-3. Three hybrid maize strains outyielded Hickory King at all spacings. The optimum spacing was 3 ft. × 15 in.
4. The application of ammonium sulphate to maize, pp. 203-5. A dressing of 500 lb. per acre of ammonium sulphate at 6 weeks after planting proved better than an application 3-4 weeks later at the tasselling stage.
5. Hybrid maize strain trials, pp. 207-8. In 2 trials, the strains 51 D.H. 12 and 50 H.35 outyielded 7 other strains tested and strain 50 H.39 outyielded 14 other strains in the second trial.
6. Soyabean spacing trial, pp. 208-9. Closer spacing between rows (2 ft. × 3 in.) gave higher yields than wider spacing.
7. Velvet-bean variety trials, pp. 209-10. The varieties 42 and Somerset gave higher seed yields than 3 other varieties tested.
8. Safflower variety and planting-distance trial, pp. 210-11. Of 4 varieties tested, Indian and Nebraska 55 gave the highest yields. A 2.5 ft. row spacing was superior to a 2 ft. spacing.—M.A.

343 **Zanzibar Protectorate** Department of Agriculture. Annual Report 1951. Zanzibar, 1953, pp. 30.

INVESTIGATIONS REPORTED :

1. Cotton variety, spacing and manurial trial, p. 12. Of 8 varieties tested from Uganda, U4/5143, MU8 ex Barberton and MU8 × BP522 A618 gave the best yields. The best combination of spacing and fertilizer application, planting at 3′ × 1′ with a dressing of 3 cwt. per acre each of ammonium sulphate and muriate of potash, yielded 1000 lb. seed cotton per ac.
2. Rice fertilizer trials, p. 13. Dressings of 2 cwt. superphosphate and 1 cwt. ammonium sulphate per ac. are recommended for the majority of rice soils. On heavier soils, the optimum dressing was 1 cwt. and 2 cwt. per ac. of superphosphate and sulphate of ammonia, respectively.
3. Cassava varietal trials, p. 13. Cassava hybrids received from the East African Agricultural and Forestry Research Organization, derived from crosses of cassava with *Manihot glaziovii*, *M. dichotoma* and tree cassava, were harvested after one year ; several clones yielded at the rate of approximately 15-20 tons per acre. Most of the hybrids appeared resistant to mosaic, but some were bitter types.—M.A.

344 **Zanzibar Protectorate** Department of Agriculture. Annual Report for 1952. Zanzibar, 1953, pp. 29.

Cotton varietal trials, p. 11. In a combined varietal and manurial trial at Hanyegwa, Mchana, the jassid-resistant, long-staple hybrid A. 7233 outyielded a recent selection C(50)20. Sunflower spacing trial, p. 12. A spacing trial at Hanyegwa, Mchana, indicated that the closest spacing used (30″ × 18″) gave the highest yield (804 lb. per acre).—M.A.

345 **Zanzibar Protectorate** Department of Agriculture. Supplement to the Annual Report 1951. Results of field experiments, crop and stock records and other statistics. Zanzibar, 1953, pp. 15.

INVESTIGATIONS REPORTED :

1. Rice manurial trials, pp. 2-5. At Kibonde Mzungu, 1 cwt. superphosphate and 2 cwt. ammonium sulphate per acre applied to sown rice and to transplanted rice gave the best results.
2. Sorghum manurial trials, pp. 5-6. At Mkwajuni, applications of ammonium sulphate at the rate of 107 lb. per acre in admixture with varying amounts of muriate of potash increased sorghum yields, but K itself had no effect.
3. Maize manurial trials, pp. 6-7. At Makunduchi, heavy responses to mixed dressings of ammonium sulphate and muriate of potash were considered largely due to the rapidity with which manured maize grew away from, and resisted, the attack of stem-borer.
4. Sunflower manurial trial, p. 7. At Kizimbani, sunflower responded significantly to dressings of 124 lb. and 248 lb. single superphosphate per acre.
5. Cotton manurial trial, p. 7. Spacing at 3ft. × 1ft., together with an application of 3 cwt. ammonium sulphate and 3 cwt. muriate of potash per acre gave a yield of 1000 lb. seed cotton per acre.
6. Rice variety trials, pp. 8-9. The semi-upland variety Mngazija, again gave the highest yields. In a trial comparing Pemba hill varieties, Kibawa and Kidunari gave higher yields than 6 other hill varieties and the semi-upland variety Mngazija.
7. Cassava variety trials, p. 9. The variety Msitu gave the highest yields, and 1000 lb. per acre more than 8 other varieties.—M.A.

346 **Burma** Department of Agriculture. Season and crop report of the Union of Burma, 1950. Rangoon, 1953, pp. 53, illus.

A detailed account, by districts, is given of : rainfall, the acreage sown to various crops (principally rice, wheat, millet, gram, beans, groundnuts and cotton) and crop yields. The area occupied by agricultural land, compared with the previous year, decreased by 37,472 ac. The yield of paddy was 11% less than in 1950 and 36% less than the average for 1935-40.—W.J.B.

347 **Australia.** Commonwealth Scientific and Industrial Research Organization. Fourth Annual Report for year ending 30 June, 1952. Canberra, pp. 173. [Received 1953]

Cereal trials, p. 28. At Kojonup, the superiority of the early wheat varieties Gabo and Wongoondy and mid-season varieties Eureka and Yalta was confirmed. In a time-of-planting trial, the varieties Gabo and Wongoondy produced higher grain yields than Eureka and Yalta, irrespective of the date of sowing. The oat variety, Orient, included in a grazing and recovery trial, was outstanding in grain yield.

Cultivation practices, p. 30. At Katherine Research Station, progressive improvement of crops of groundnuts and cotton was shown in the third year of continuous cropping. Cultivation during crop growth had marked beneficial effects, especially during a dry year.—M.A.

348 **United States.** Western Weed Control Conference. *Proc. 13th Western Weed Contr. Conf. 1952* pp. 118. [Received 1953]

Among the papers read at this meeting were the following :

1. Relation of pH to the penetration and translocation of 2,4-D in plants. by A. S. Crofts, pp. 1-6. Data are given showing that the lower the pH of 2,4-D solutions, the greater was the absorption and translocation of 2,4-D by bean plants.
2. Factors which determine the effectiveness of growth regulator herbicides on Canada thistle. By L. W. Rasmussen, pp. 7. The herbicide 2,4-D was more effective against *Cirsium arvense* than was 2,4,5-T. Best control followed treatments to young growth in the bud stage, or to succulent regrowth in autumn.
3. Control of white top (*Cardaria draba*) by combined chemical, cropping and tillage methods. By J. M. Hodgson, pp. 9-12. [See Abs. 272.]
4. Response of Thatcher spring wheat to 2,4-D rates applied in low volumes of oil and water. By R. L. Warden, pp. 12-17. [See Abs. 36.]
5. Weed control in peas with herbicides. By C. I. Seely, pp. 17-21. [See Abs. 132.]
6. IPC and Chloro IPC as representative carbamates as herbicides. By V. H. Freed, pp. 21-7. The herbicidal characteristics and uses of IPC and ClIPC are reviewed.
7. Studies of herbicidal action on aquatic weeds using radioactive 5-i,2,4-D. By H. E. Hosticka and others, pp. 40-8. Studies, using 5 iodo$^{131}$, 2,4-D acid butyl ester, are reported on herbicidal uptake and translocation in *Carex aquatilis*, *Typha* spp., *Anacharis canadensis* and *Potamogeton nodosus*, in the presence of different co-solvents, carriers and surface-active agents.—P.J.B.

349 **United States.** Proceedings of the Association of Southern Agricultural Workers. 50th Convention. New Orleans, 1953, pp. 215.

Among the papers presented were the following :

1. Mechanical drying of groundnuts. By J. M. Myers, p. 28. Groundnuts with moisture contents of 40%, or less, could be satisfactorily dried on a batch-type crop drier with no apparent injury to the kernels. Air temperatures above 115°F. caused skin slip. Groundnuts dried to moisture contents below 7% had relatively high proportions of slipped skins.
2. Certain physiological and chemical changes within the peanut plant associated with fruit production. By E. T. York and P. H. Reid, pp. 50-1. Results of trials showed that inhibition of pod formation markedly increased flower production. Failure of seed formation caused only slight increases in flower production. Dry weights of plants were greatly increased in the absence of seed or pod formation. Seed and pod formation caused a reduction in the proportion of flowers producing pegs.
3. Nutrient deficiencies in groundnuts and their influence on fruit production. By E. T. York and P. H. Reid, p. 51. [See Abs. 129.]
4. Response of nutgrass to soil applications of organic insecticides. By J. G. Watts, p. 107. In trials over 5 years in S. Carolina on a sandy loam soil, 5 applications of 50 lb. of 3% gamma isomer BHC per ac. significantly increased stands of *Cyperus rotundus*, compared with where one application was made. DDT and Toxaphene also increased *C. rotundus* infestation, though only when applied at rates well above those in normal use.
5. Induction of flowering in the Jersey type sweet potato. By A. E. Kehr and others, p. 128. Buds and flowers in Jersey type (dry type) sweet potatoes were obtained where the Jersey variety, Orange Little Stem, was used as a scion on *Ipomoea* species, such as *I. rubra* and *I. carnea* (= *I. crassicaulis*), which do not form storage roots. Flowering was thought to be due to storage of nutrients in the above-ground parts of the plants, in the absence of tubers.
6. Morphological structure of the surface layers of the sweet potato with relationship to skin injury. By A. E. Kehr, p. 131.
7. Specific gravity relationships of sweet potatoes. By T. Hernandez, pp. 131-2.
8. The distribution of ascorbic acid and latex vessels within three tissue regions of sweet potatoes. By W. F. Jenkins and E. L. Moore, p. 136.
9. The effects of soil fumigation on populations of parasitic nematodes, incidence of Fusarium wilt and yield of cotton. By L. D. Newsome and W. J. Martin, p. 158. In trials in Louisiana on soils heavily infected with *Fusarium vasinfectum* and with nematodes of the genera *Meloidogyne*, *Pratylenchus*, *Tylenchorynchus* and *Trichodorus*, applications of 2 gal. ethylene dibromide, 4 weeks before sowing, resulted in markedly reduced wilt incidence and increased yields and plant height.
10. Fusarium wilt resistance and fibre properties of

some new cotton hybrids and selections. By D. C. Neal, p. 159. In trials on soils heavily infested with 3 species of nematodes, the most promising hybrids in terms of nematode-resistance and fibre quality were: Louisiana 33 and 3314, Deltapine 6-8-5 × Delfos 6102 and Deltapine 6-8-5 × Delfos 6102 × Deltapine 6-8-5.
11. The incorporation of $C^{14}$ in the cell walls of elongating cotton fibres. By J. C. O'Kelley, p. 166.
12. Effect of X-rays on respiration and growth of excised corn [maize] roots. By M. W. Jones and R. D. Powell, p. 166. It was concluded that the inhibiting effects of IAA and X-rays on growth were not inter-dependent.
13. Some factors affecting the yield of Jumbo Runner groundnuts. By G. M. Shear and L. I. Miller, p. 170.
14. The effect of various moisture contents in the Dixie Runner groundnut on free fatty acids, germination and respiration during storage. By H. S. Ward, pp. 170-1. The results of trials showed that Dixie Runner groundnuts could be stored for 7 months at temperatures up to 35°C. without increasing free fatty acid content or germination, where the moisture content was held at 7%. Germination percentages could be maintained above 80 only where moisture contents were 6%.
15. Studies on chemical defoliation and regrowth inhibition of cotton. By W. C. Hall and others, pp. 175-6. [See Abs. 218.]—P.J.B.

350 **Canada.** National Weed Committee, Eastern Section. Proceedings of 6th Meeting, 1952. 1953, pp. 148.

INVESTIGATIONS REPORTED:
1. The present status of TCA and dinitros. By J. S. Wilson, pp. 35-9. Recommendations are given for the use of these materials for selective weed control and for pre-emergence weed control in field crops.
2. Premerge as a pre-emergence herbicide. By J. S. Leefe, pp. 40-1. Premerge (DNOSBP) has proved satisfactory as a pre-emergence herbicide for use with large-seeded crops, but not with small-seeded crops. Premerge at 1 gal. per ac. has given good results with peas.
3. The history and development of MCPA. By W. B. Fox, pp. 42-5. A review of the literature is given, with comparisons between MCPA and 2,4-D.
4. Aero sodium cyanamide, Soluble X-5. By A. T. Sinclair, pp. 47-9. $NaHCN_2$ sprays applied as post-emergence treatments at rates of 10-20 lb. per ac. have given good control of weeds in peas. Notes are given on current trials with this compound for defoliating seed crops before harvest.
5. CMU for weed control in field crops. By G. Knowles, pp. 58-60. [See Abs. 281.]
6. Studies on some factors limiting the geographic distribution of orange hawkweed. By R. Cayouette, pp. 77-9. Observations made on orange hawkweed (*Hieracium* spp.) in Quebec showed that it began growth in mid-May with minimum temperatures of 45°F. and a day length of 15 hr. Flowering took place 5 weeks later when day length was 16 hr. The northern limit of aggressiveness for this weed in Canada was 48°30′.
7. Experiments on the control of water weeds. By K. K. Bragg, pp. 136-9. In trials to control cat-tail (*Typha* spp.) mixtures of 2,4-D and 2,4,5-T, each at 1.2 lb. per ac., + 30 lb. sodium chlorate per ac., applied in late June, gave good results. For bulrush (*Scirpus* spp.) control, trials with a number of herbicides showed that fair control could be secured by treatment with 2,4-D + TCA and with 2,4-D + 2,4,5-T + sodium chlorate.—P.J.B.

351 **Australia.** Department of Agriculture and Stock, Queensland. Annual Report for the year 1951-52. Brisbane, 1952, pp. 125, illus. [Received 1953]

INVESTIGATIONS REPORTED:
1. A new wheat variety, p. 47. The wheat variety Spica has now been registered and released for general use. It has shown a high yielding ability and good gluten strength in addition to excellent field-resistance to rust.
2. The effect of nitrogenous manuring on mottling in wheat, p. 47. Nitrogen applied as sulphate of ammonia and as nitrate of soda, at any time between sowing and flowering, reduced the percentage of mottled grain occurring in wheat crops.
3. Varietal and manurial trials with maize, pp. 47-8. The variety Durum yielded slightly less than the Atherton Dent type on the Atherton tableland, but was more easily handled by a mechanical picker and gave a better sample of grain of a lower moisture content.
4. Rates of sowing for linseed, p. 48. Sowing rates of 20-26 lb. per ac. gave significantly higher yields than a rate of 14 lb. per ac. in the relatively dry season of 1951. A general sowing rate of 20 lb. per ac. is recommended.
5. A cotton variety suitable for mechanical picking, p. 49. Among recently introduced varieties suitable for mechanical picking, Empire is the most promising for both dry-farming and irrigated conditions.
6. The effect of irrigation on wheat, p. 56. Spray irrigation of 2 in. of water applied in late September, following earlier irrigation of 4 in. gave gains of 5-12.5 bu. per ac. above those obtained by early irrigation alone. Late September irrigation gave greater gains from slow-maturing than from early-maturing varieties.
7. Cotton rotations on irrigated land, p. 56. Cotton following Rhodes grass substantially out-yielded cotton following either cotton or grain sorghum.—W.J.B.

# NEWS ITEMS AND NOTES

**eat Britain**

2 The First National Weed Control Conference Great Britain was held at Margate from 2nd to 5th vember, 1953. The Conference was organized by the eed Control Joint Committee, an *ad hoc* committee med as a result of a meeting of representatives of most the organizations in Great Britain interested in weed ntrol. The Conference, it is envisaged, will be held nually and is intended to provide a meeting-ground for those interested in the practical and scientific aspects vegetation control. It is also intended to provide a um for reviewing the most recent developments in all anches of the subject, and, by means of standing com- ttees, to perform certain advisory and co-ordinating nctions. The papers read at this 1st Conference were ued as separates immediately before being presented the actual Conference; some of them are abstracted in her parts of this number of *Field Crop Abstracts*.—P.J.B.

**ly**

3 Wheat is the most important crop in Italy. Its tal production in 1953 was 8,800,000,000 kg., the highest record, from an area of about 4,800,000 ha. This high oduction, which covers the Italian wheat requirement, as due to favourable climatic conditions and improved rming methods. The previous record was 8,183,800,000 . in 1938. *Ital. Agric.* and *G. Agric. Domen.* August, 53.—E.B.O.

4 Seeds Offered in Exchange by the Istituto e rto Botanico della Facoltà di Agraria, Portici, Naples University, include 585 species. A list of these seeds is given in *Ann. Fac. Agr., Napoli* 1949-50.—E.B.O.

**Nyasaland**

355† The Nyasaland Farmer and Forester. This new quarterly publication is the successor of the *Nyasald agric. quart. J.* It purposes to present to farmers, planters, stock-keepers and foresters a wider background to agricultural and forestry problems, particularly those connected with mixed farming. Subject matter will include articles of a practical and scientific nature. The publication will draw upon the agricultural forestry and veterinary departments as well as on the knowledge of local farmers for its material.—M.A.

**Ceylon**

356† A Revised System of Land-Tenure is being introduced into the rice-growing areas of Ceylon under the provisions of the Paddy Lands Act, No. 1, 1953. In the first instance, until experience of administering the act is gained, the provisions will operate only in regions declared "controlled areas". The new act prescribes fixed rents for each area, prohibits the leasing of land for periods of less than 5 years and forbids the demand or receipt of a premium in addition to rent as a condition of the granting or renewal of tenancies. The new laws for the leasing of land will replace the traditional system of land-tenure under which it was normal for the tenant to pay the landlord a rent equivalent to half the value of the crop. It is hoped that the new fixed rents will encourage tenant farmers to increase rice production. *Trop. Agriculturist* 1953, Vol. 109, No. 1.—W.J.B.

# FIELD CROPS

## CEREALS

### WHEAT

357 HAYWARD, J. J. **Wheat can defy severe drought.** *Fmr's Wkly, Bloemfontein* 1953, **86,** 14-17, illus.

The adoption of the fallow and stubble-mulch system of growing wheat on 2 farms in the wheat belt of the Orange Free State is described. This method of preventing soil-moisture evaporation by leaving the stubble of the previous wheat crops on the surface of the soil, and by cultivating weeds to control them during the fallow period, coupled with the use of new drought-resistant wheat varieties, has resulted in the use of less seed for sowing and in higher yields of wheat, even under extremely dry growing conditions.—M.A.

358 CAPUTA, J. and AEBI, H. La valeur du maïs-grain comme culture précédant le froment d'automne. Résultats d'un essai d'assolement. [**The value of maize as a preceding crop to autumn wheat. Results of a rotation experiment.**] *Rev. rom. Agric.* 1953, **9,** No. 12, 94-6, illus. [Sta. Féd. Essais Agric., Lausanne]

A rotation experiment was commenced in 1952 at Beau-Cèdre (Switzerland) to test the effect of sowing crimson clover, maize, potatoes and barley before autumn wheat. Maize gave equally good results as potatoes as a preceding crop. For autumn wheat crimson clover gave the best results on the following wheat crop of the four crops sown. —M.A.

359 MORRIS, G. P. **Descriptions of wheat and barley varieties.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 456-60, bibl. 2, illus.

Descriptions are given of two provisionally recommended varieties of wheat, Cappelle Desprez and King II, and of Proctor barley.—C.L.S.

360 FAJERSSON, F. Weibulls Original Svenno-vårvete. Ny, tidig, extremt stråstyv sort med hög kärnavkastning. [**Weibull's Original Svenno spring wheat. New, early, very stiff-strawed variety with high grain yield.**] *Weibull's Årsb.* 1953, Autumn, 6-11, illus.

Svenno spring wheat (originally designated W.4808), a sister variety to Kärn II, will be released to growers in Sweden in 1954. In comparative yield trials during 1947-52 with 8 varieties, Svenno outyielded all other varieties, including Pondus and Kärn II, though this was largely due to the good performance of Svenno in 1951, when black rust was prevalent, and in 1952, when mildew was widespread. Where the values for 1951 and 1952 were omitted, Svenno outyielded Kärn II by 2% and gave 1% lower yields than Pondus. Svenno has considerably stiffer straw than either Pondus or Kärn II, and is stated to be the first Swedish variety combining earliness with extreme straw-stiffness.—P.J.B.

361 WAGENINGEN. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze. No. 152. Wintertarwe, 1953. [**Report on the choice of varieties. Pamphlet No. 152. Winter wheat, 1953.**] *Suppl. 18. LandbVoorl.* 1953, **10,** No. 9, pp. 4.

Varieties of winter wheat with good, moderate and poor resistance to cold were tested for yield on a variety of soils. In general, the varieties with the least resistance to cold, such as Minister and Nord Desprez, gave the highest yields. One variety with good resistance to cold, Heine's VII, gave yields comparable with those of Minister. Heine's VII is described as a short, stiff-strawed, early-ripening variety with only a moderate resistance to mildew and to black and brown rust.—W.J.B.

362 WAGENINGEN. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 153. Zomertarwe, 1954. [**Choice of varieties. Pamphlet No. 153. Spring wheat, 1954.**] *Suppl. 1. LandbVoorl.* 1954, **11,** No. 1, 1-2.

The spring wheat varieties, Peko, Blanka, van Hoek, Koga and Weibull 4138 were compared in tests held on 6 different soil-types in the Netherlands in 1953. Peko consistently outyielded all other varieties on all types of soil. The variety Koga, which also yielded well, was remarkable for its resistance to shedding.—W.J.B.

363 NEGRETTI, E. I risultati di cinque anni di punte granarie. [**The results from 5 years' wheat competitions.**] *Humus* 1953, **9,** No. 10, 5-14, illus. [Isp. Agr. Compart. Lombardia, Milano, Italy]

From the results obtained in 5 years' wheat competitions in Lombardy, the following wheat varieties are recommended for cultivation in the plains: Mara, 0·10 and Fortunato, for compact soils of high fertility; Mara, Damiano Chiesa, Funo and S. Pastore, for soils of medium consistency; Mara, Damiano Chiesa and S. Pastore, for loose soils. The following are recommended for cultivation in the hills: S. Pastore, Mara, and, in some cases, Fortunato and Damiano Chiesa, for compact soils; S. Pastore, Grifo, Mara, Freccia and Impeto, for soils of medium and loose consistency. The following are recommended for the mountains: Impeto for compact soils and for soils of medium consistency, and, in particular, Mentana for poor soils and S. Pastore for regions non-subject to late frosts. [See also *Fld Crop Abstr.* 6 : 17.]—E.B.O.

364 Gadea, M. Cuarto año de experiencias con nuevas variedades de trigos. [**Fourth year of trials with new wheat varieties.**] *An. Inst. Invest. agron.* 1953, **2,** No. 2, 93-199. [Cent. Cerealicult., Madrid]
An account is given of trials carried out in 1951-2 which are a continuation of the 1949-51 trials [see *Fld Crop Abstr.* 6 : 469].—E.B.O.

365 Perini, D. and Verona, O. Sulla diffusione in Italia delle vecchie e nuove razze di frumento. [**The distribution of old and new wheat varieties in Italy.**] *Suppl. Ann. Sper. agr.* 1954, **8,** No. 1, 44-77, bibl. 2, illus., English summary p. 77.

366 Téllez, R. M. Ensayos comparativos de rendimientos de trigos híbridos. 2. [**Comparative yield trials with wheat hybrids. 2.**] *An. Inst. Invest. agron.* 1953, **2,** No. 2, 201-32, bibl. 1, illus. [Cent. Cerealicult., Madrid]
Results are given from trials carried out in 1951-2 which are a continuation of those described previously [see *Fld Crop Abstr.* 6 : 474]. The programme for the 1952-3 trials is given.—E.B.O.

367 Briggs, F. N. **Registration of improved wheat varieties 20.** *Agron. J.* 1953, **45,** No. 7, 317.
A note is given on Sioux (C.I. 1214, Reg. No. 347) a winter-hardy variety which is resistant to bunt. Sioux is adapted to most of Nebraska, except the north-eastern parts. In trials in Nebraska, it has outyielded Turkey and Pawnee and equalled Nebred and Cheyenne in yield. Sioux was selected from a Cheyenne x Turkey 1062 cross.—P.J.B.

368 Dedecca, D. M. Variedades agrícolas de trigo (*Triticum aestivum* L.). Caracterisizacão botânica de algumas variedades em experimentação em São Paulo. [**The botanical classification of the commercial varieties of *Triticum aestivum* (*T. vulgare*) grown in Brazil.**] *Bragantia* 1952, **12,** No. 1-3, 19-53, bibl. 30, illus., English summary p. 52. [Inst. Agron. Campinas, Brazil]
Twenty-seven varieties of wheat, shown in trials to be the best adapted to the conditions of the State of São Paulo, Brazil, were classified according to their botanical characteristics. There is an account of each variety in which both botanical and agronomic characteristics are described.—W.J.B.

369 Vargas, R. Variedades de trigo para la costa central del Peru. [**Varieties of wheat for the central coast of Peru.**] *Inform. 83. Esta. Exp. Agric. La Molina, Peru* 1953, pp. 16, bibl. 5, English summary p. 16.
A report is made on the investigations carried out in 1950-2 on the yield, earliness, baking-quality and resistance to black rust (*Puccinia graminis tritici*) of a number of wheat varieties. The 3 most outstanding of the varieties tested, now recommended for use in the central coast region of Peru, were LM Marina 49 and 50 and LM Mariache.—From author's summary.

370 Sardar Khan and Rashid Khan, A. **Punjab wheats and their important characteristics.** *Agriculture, Pakist.* 1951, **2,** No. 1-2, 61-4.
The characteristics of the important wheats grown in the Punjab: C-591, C-518, C-217, C-228 and C-250 are described. There are notes on: earliness, stiffness and length of straw, yield, suitability for rain-fed or irrigated conditions and the appearance and baking quality of the grain of each variety.—W.J.B.

371 Miranda, H. de and Broekhuisen, S. Het probleem van de bakkwaliteit van inlandse tarwe. [**The problem of baking quality in home grown wheat.**] *Tech. Ber. 6. Stichting CoCoBro., Wageningen* 1953, pp. 20, bibl. 9, illus., English summary pp. 18-19.
Trials were carried out to determine the yields and baking quality of numerous Dutch, German and French wheat varieties with a view to providing material from which high-yielding wheats of good baking-quality may be bred. As a result of the trials, the wheat varieties tested were graded in respect of both qualities. Among the wheats classed as first-grade baking wheats, the winter wheats Heine 51 and Carsten's 8 and the spring wheats Strube 4090 and Strube 5838 were outstanding for their high yields.—W.J.B.

372 Gassner, G. Untersuchungen zur physiologischen Charakterisierung unserer Weizensorten. [**Research on the physiological characterization of German wheats.**] *Züchter* 1953, **23,** No. 7 and 8, 193-206, bibl. 34, illus. [Braunschweig]
An account is given of experiments made in 1950 in which the steeped seed of 14 German wheat varieties was chilled at +1°C. for durations ranging from 10 to 90 days; and of experiments in 1952 when the seed of 30 varieties was similarly treated for durations of 45 or 60 days only. The wheats are classified in 7 groups, according to the duration of chilling at +1°C. required to produce early and even shooting into ear. Seven varieties are named as standard representatives of the different groups. Optimal vernalization technique is discussed.—G.M.R.

373 DRAGONE-TESTI, Giuseppina. Azione del nitrato di piombo sullo sviluppo radicale dei semi germinanti in rapporto con la natura delle riserve. [**Effect of lead nitrate on the root development of germinating seeds in relation to the nature of the seed reserves.**] *Ann. Bot., Roma* 1950, **23,** No. 2, 231-6, bibl. 34, English summary p. 234. [Received 1954]

Germinating seeds of lentil, wheat and sunflower were treated with dilute solutions of lead nitrate, at concentrations ranging from N/100 to N/1000. This treatment had an uncertain effect on lentil, but had a stimulating effect on wheat and, even more so, in the case of sunflower. This different reaction is thought to be related to the different nature of the seed reserves.—E.B.O.

374 STRYCKERS, J. Hogere meer-productie en betere onkruidbestrijding in wintergranen door bespuiting met ammonium dinitro-ortho-cresol tijdens de winter. [**Higher yields and better weed control in winter cereals by means of ammonium DNOC sprays applied in winter.**] [Reprint from] *Land- en Tuinbouwjaarb.* 1953-4, 135-144, bibl. 10, illus. [Rijkslandbhoogesch., Gent]

The effect of variations in date and rate of application of ammonium DNOC on the growth of weeds and on the yields of winter cereals was tested in experiments with winter wheat and rye in 1951-3. DNOC 0·25% and 0·5% was applied at a rate of 1000 l. per ha. to the cereal crops at various dates from 26 January to 15 March. Cornflower was controlled at all dates and both rates of application of DNOC. Other weeds, notably *Matricaria* sp., *Apera spica-venti* and vetches, were only partially controlled by applications made before 7 February because at that time their seeds had not all germinated. In general, the best control of weeds was obtained by applications of 5% DNOC made in the period 7-26 February. There was a falling-off in the control of weeds when applications were made after 26 February. The greatest increases in wheat-grain yields over the controls (no DNOC applied) were obtained from applications in the period 13-18 February, which gave yields 58% higher than the controls; applications made between 15 and 18 March gave notably smaller increases in yields over the controls. Experiments by other workers indicating the stimulatory effect of ammonium DNOC on yields are discussed. An advantage of winter applications of DNOC to cereals is the resulting reduction in the amount of labour needed for spraying weeds in spring; a disadvantage is the difficulty of using machinery on the land in winter conditions.—W.J.B.

375 MILLER, P. R. **Seed treatment tests for bunt control.** *Agric. Chem.* 1954, **9,** No. 2, 68A-68B, 141 and 145.

Data are given of the effectiveness of fungicidal treatments for the seed of 2 varieties of winter wheat inoculated with bunt (*Tilletia caries*). The trials were carried out at Pullman, Washington, during 1951-2. Notes are given on the use of BHC as a seed-treatment material.—P.J.B.

376 MISRA, A. P. **Influence of the suspension of summer cultivation of wheat and barley on the incidence of black rust.** *Indian J. agric. Sci.* 1953, **23,** Pt. 1, 47-54, bibl. 8, illus. [Dir. Pl. Prot., Minist. Agric., New Delhi, India]

An account is given of the incidence of black rust (*Puccinia graminis tritici*) on wheat crops in India and of attempts to control it by prohibiting the growing of summer (April-September) crops of wheat during the period 1949-51. The prohibition was not fully enforced. The disease is first seen (August) in crops in the southern part of India and appears progressively later at increasingly northerly latitudes. During the period 1949-51 black rust was observed in summer crops grown in the Nilgiri and Palni hills which are believed to be the foci of the disease in India. Summer crops grown on the plains bordering the Nilgiris and Palnis are believed to be secondary sources of infection for the extensive winter-grown crops of wheat on the plains.—W.J.B.

377 KOMMEDAHL, T. **Cornstalks may lower health of wheat crop.** *Ohio Fm Home Res.* 1953, **38,** No. 285, 105-6, illus.

In pot trials, the addition of maize residues to soil resulted in an increased incidence of Fusarium and, to a lesser extent, Rhizoctonia infections of wheat sown in the soil. The addition of N in the form of ammonium sulphate had no effect on the incidence of these pathogens in the wheat plants, which appeared to be independent of the C/N ratio in the soil. In field trials, the addition of maize residues to the soil had no appreciable effect on the incidence of Fusarium infection, or seedling blights of oats, compared with where no residues were added. Oats did not appear to be susceptible to the same strains of the pathogens as wheat or maize.—P.J.B.

378 GOUGH, H. G. **The problem of the wheat bulb fly.** *Agriculture, Lond.* 1953, **60,** No. 7, 315-20, bibl. 4.

The problem of the wheat bulb fly [*Hylemyia coarctata*] is reviewed with special reference to the damage caused by the pest to wheat in East Anglia in the season 1952-3. The heavy attack on the crop in 1952-3 is attributed to unusually favourable conditions for egg-laying in the summer of 1952, followed by the slow development of wheat plants caused by an exceptionally cold winter. Heavy attacks usually occur when wheat succeeds potatoes or a fallow. The spraying of the preceding potato crop with DDT from July onwards caused some reduction of wheat bulb fly attacks in trials carried out in 1945. Crops sown in early autumn or in spring are less likely to suffer damage than late spring-sown crops. There are notes on the estimation of damage to succeeding wheat crops on the basis of egg counts made in potato fields.—W.J.B.

379 Eckroth, E. G. and McNeal, F. H. **Association of plant characters in spring wheat with resistance to the wheat stem sawfly.** *Agron. J.* 1953, **45,** No. 9, 400-4, bibl. 8. [Montana Agric. Exp. Sta., Bozeman]

380† Lowe, A. D. **BHC and Lindane are dangerous to wheat.** *N.Z. J. Agric.* 1953, **86,** No. 4, 305-6, illus. [Ent. Res. Sta., Dep. Sci. Industr. Res., Ashburton, N.Z.]

Work at the above Station over the past 6 years has resulted in DDT and BHC being recommended for the control of grass-grub (*Costelytra zealandica*, formerly *Odontria zealandica*) and subterranean grass caterpillar or "porina" (*Oxycanus* spp.) at the rate of 2 lb. of active ingredient per acre. Present recommendations are that these insecticides should be broadcast with farm machinery normally used for sowing, and the substance is usually mixed with superphosphate and sown through a top-dresser. However, experiments have shown that the germination of wheat seed is endangered when the seed is drilled with BHC or a newer preparation, Lindane, and the results of these experiments are discussed.—Author's summary.

381 Church, B. M. and others. **Surveys of rabbit damage to wheat in England and Wales, 1950-52.** *Pl. Path.* 1953, **2,** No. 4, 107-12, bibl. 3. [Rothamsted Exp. Sta., Harpenden, Herts.]

The results are given of a pilot survey in Kent in 1950 and a nation-wide survey in 1952, carried out to determine the extent of rabbit damage to cereals. The methods used to make the survey and to evaluate the results are discussed in some detail : it is concluded that they were reliable. In the pilot survey in Kent, the estimated average yield increase of spring wheat was 3 cwt. per ac. as a result of fencing against rabbit damage. In the nation-wide survey, 5 provinces, which included 85% of the total wheat acreage, were studied. Average losses in winter-wheat yields averaged 1·6 cwt. grain per ac., or 6·5% of the total yield. On farms with cereal crops showing obvious rabbit damage, yield increases were estimated to be 3-4 cwt. grain per ac. where rabbit damage was prevented.—P.J.B.

382 Kretovič, V. L. and Evstigneeva, Z. G. [**Synthesis of protein from asparagine and glutamine in wheat seedlings.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **93,** No. 5, 879-81, bibl. 7. [A. N. Bach Biochem. Inst., Acad. Sci., USSR]

383 Renner, Ruth and others. **Nine essential amino acids in the protein of wheat and barley grown on sulfur-deficient soil.** *Proc. Amer. Soc. Soil Sci.* 1953, **17,** No. 3, 270-3, bibl. 11. [Univ. Alberta, Edmonton]

Data are given of the content of 9 amino acids in the grain of wheat and barley grown in a wheat/oats/barley/legume-hay rotation and of wheat in a continuous wheat/fallow rotation. Different manurial treatments were applied and the crops were grown on S-deficient, grey, wooded soil in Canada. In wheat grain grown in the first rotation and receiving manures containing S, the average amino acid content was 8·3% above that where no manures containing S were applied, though respective protein contents did not differ appreciably. With wheat grown in the wheat/fallow rotation, manures containing S did not significantly increase the amino acid content of the grain. Highly significant increases in the isoleucine, valine, methionine and threonine content and significant increases in the leucine content of the grain protein were caused by applying manures containing S to wheat grown in the first rotation. The protein content of barley grown during the first year after the legume crop was higher than that grown during the third year after the legume crop. The relatively higher protein content of the grain grown during the first year after legumes was associated with a low content of amino acids, though this was considerably offset where manures containing S were applied.—P.J.B.

384 Misra, G. **Photoperiodic response of some Indian wheats.** *Science* 1953, **118,** No. 3068, 445-6, bibl. 8. [Bot. Dep., Ravenshaw Coll., Cuttack, India]

Studies were made on 2 Indian strains, R-1 (Sarojini) and R-9 (Vijaya), to determine whether their photoperiodic response was similar to other Indian wheats and to determine their stage of optimum response to photoperiod. Different 8 and 24 hr. photo-periodic treatments were given. Exposure to 24 hr. photoperiods shortened the vegetative period ; where 16-day-old seedlings were exposed to 24 hr. photoperiods for 8 days, only, the time from sowing to heading was reduced by 5-8 days in both varieties, compared with controls grown in the field. Seedlings exposed to 24 hr. photoperiods for 32 days, starting when they were 8 days old, took 23-25 days less to mature than controls. The increase in earliness of seedlings exposed to 24 hr. photoperiods was little affected by the age of the seedlings, which varied from 8 to 32 days. To obtain maximum earliness, the seedlings required to be exposed to 24 hr. photoperiods for long periods when they were 8-16 days old. Control seedlings, exposed to 10-11 hr. photoperiods, took less time from sowing to ear emergence than plants under 8 hr. photoperiods; exposure to 8 hr. photoperiods for 24 to 32 days delayed maturity by 13-17 days, compared with controls. The effect of photoperiod on the maturity of N.P.54, N.P.4, N.P.165 and N.P.114 was similar to R-1 and R-9.—P.J.B.

385 CHEVALIER, R. Echaudage du blé et poids de mille grains. [**Heat-effect on wheat and thousand-grain weight.**] *Ann. Inst. nat. Rech. agron., Paris. Sér B. Ann Amélior Pl.* 1953, **3,** No. 2, 275-95, bibl. 5.

The term heat-effect defines the state or condition of a cereal, after flowering, which has been affected by hot, dry weather. Experiments were conducted at Montpellier, from 1947, on a large number of wheats with a view to classifying them into categories depending on their resistance to this heat-effect; low 1000-grain weight was recorded in plants susceptible to heat-effect. Six categories were defined in decreasing order of physiological sensitiveness to heat-effect. The small number of wheats resistant to heat-effect were found amongst those which were also resistant to rusts and other diseases and included the following recently introduced wheats: Petirrojo, Saunders, Redman, Regent, Renown, Rescue, Comanches.—M.A.

386 LANZA, F. Contributo allo studio della jarovizzazione di alcuni *Triticum.* Nota 1. Ricerche agrobiologiche. [**A contribution to the study of vernalization in some *Triticum* varieties. Note 1. Agrobiological investigations.**] *Publ. 85. Sta. chim-agr., Roma* 1952, pp. 19, bibl. 25, illus.

A plot trial was carried out with the autumn wheat variety Tevere to compare plants grown from spring-sown vernalized seed with plants from non-vernalized seed, sown both in spring and in autumn. The spring-sown non-vernalized seed was pre-germinated immediately before sowing. The vernalization treatment consisted in keeping the seeds at 0—1°C. for 49 days. Spring sowing took place on 29 February. The results indicated that the Tevere variety has a moderate autumn character as it is capable, when sown in spring, of completing its biological cycle without vernalization. The plants from vernalized seed were earlier, yielded more, had a higher ratio of seed to straw and a higher hectolitre weight than the plants from spring-sown non-vernalized seed. The plants from autumn-sown seed, however, were superior to the plants from vernalized seed in all these respects. Preliminary trials were also carried out to study the adaptation of 3 varieties of *Triticum vulgare* from Russia and of a branched wheat variety (*Triticum turgidum compositum*).—E.B.O.

387 TOMBESI, L. and others. Contributo allo studio della jarovizzazione di alcuni *Triticum.* Nota 2. Ricerche agrobiochimiche. [**A contribution to the study of vernalization in some *Triticum* varieties. Note 2. Agrobiochemical investigations.**] *Publ. 86. Sta. chim.-agr., Roma* 1952, pp. 7, bibl. 10, illus.

These investigations were carried out to study the changes in the enzymatic complex caused by vernalization treatment in various stages of development of the wheat variety Tevere. [See previous abstract.]—E.B.O.

388 HEYLAND, K.-U. Qualitätsuntersuchungen am Stroh von deutschen Weizensorten. [**Studies of straw quality in German wheat varieties.**] *Z. Acker- u. Pflbau* 1953, **97,** No. 2, 129-54, bibl. 24. [Landw. Hochsch. Hohenheim]

Based on 3 years' studies of a large number of German wheat varieties, tabulated information is presented on: (1) haulm length; (2) haulm weight; (3) haulm weight per unit length (confirming the finding of earlier writers that a positive correlation exists between this character and strength of straw); (4) haulm diameter in mm.; (5) microscopic measurements in 3 winter- and 3 summer-wheats (varietal differences in the thickness of the sclerenchyma ring and cell-wall strength were most noticeable); (6) mean fibre-length in 3 winter- and 3 summer-wheats, 1st and 4th internodes, (varietal differences noticeable); (7) suction force tested with liquid manure, $H_2O + NH_3$, and $H_2O$ (very great varietal differences were exhibited; climatic factors were also of influence); (8) chemical analysis of 23 winter- and 12 summer-wheats (the content of inorganic substances appears to depend greatly upon environmental factors, climatic in particular; the content of organic substances was found subject to great fluctuation due partly to environmental and partly to varietal factors, cellulose content being especially liable to varietal differences); (9) average number of internodes and proportion of leaf, together with maximum and minimum values, in 54 winter- and 23 summer-wheats. Some applications of these findings to the assessment of straw for different economic purposes are noted.—G.M.R.

389 PETRUCCI, D. Azione del fluoruro di sodio sul catabolismo aerobico ed anaerobico di *Triticum vulgare* e di *Vicia faba.* [**Effect of sodium fluoride on the aerobic and anaerobic katabolism of *Triticum vulgare* and *Vicia faba.***] *Ann. Bot., Roma* 1950, **23,** No. 2,

304-12, bibl. 10, illus., English summary p. 312. [Received 1954] [Ist. Bot., Univ. Roma]

390 Tombesi, L. and others. Ricerche di fisiologia e di biochimica su *Triticum vulgare*. Nota 1. Intensità fotosintetica e respiratoria, attività enzimatiche e contenuto in acido ascorbico e glutatione ridotto durante le fasi del ciclo vegetativo. Nota 2. Influenza delle varie forme di azoto e della carenza di fosforo e potassio sul complesso enzimatico. [**Investigations into the physiology and biochemistry of *Triticum vulgare*. Note 1. Photosynthetic and respiratory intensities, enzymatic activities and ascorbic acid and reduced glutathione content during the phases of the vegetative cycle. Note. 2. Influence of various forms of nitrogen and of phosphorus and potassium deficiency on the enzymatic complex.**] *Ann. Sper. agr.* 1953, **7**, No. 5, 1531-63, bibl. 22, illus., English summary pp. 1545 and 1561-2. [Sta. Chim.-Agr. Sper., Roma]

391 El Nahal, A. K. M. **Fumigation of agricultural products. 6. Penetration and sorption of hydrogen cyanide in wheat fumigated at reduced pressures.** *J. Sci. Fd Agric.* 1953, **4**, No. 11, 517-27, bibl. 3, illus. [Brit. Gelatin and Glue Ass., London, N.7]

The penetration of hydrogen cyanide into bags of wheat of different moisture contents was determined. Three methods of fumigation were used: sustained-vacuum fumigation, vacuum fumigation with simultaneous admission of air and fumigant, and fumigation at atmospheric pressure. Both the changes of concentration with time and the residual fumigant in the wheat were determined, and the relationships between these two quantities were investigated by means of a covariance analysis. The method of vacuum fumigation with simultaneous admission of air and fumigant gives penetration and residues of fumigant similar to those obtained at atmospheric pressure. Sustained-vacuum fumigation was superior to the other two methods over the same exposure periods, but the enhanced penetration of the mass of grain may be accompanied by a disproportionately higher sorption of fumigant. Sorption was increased considerably on wheat of higher moisture contents.—Author's summary.

## OATS

(See also Abs. 697.)

392 Sandfaer, J. **Studies on the basis of selection for yield in cereal crops. The importance of tillering and number of heads in oats and barley.** *K. VetHøjsk. Aarsskr.* 1953, 1-14, bibl. 4.

Studies in Denmark are reported on the correlation between tillering and number of heads, and grain yields in a number of Danish oat and barley varieties. Oat varieties used included 4 old (pre-1934) and 4 new, high-yielding varieties. Plants were spaced as follows: 5 × 5, 10 × 5, 10 × 10 and 20 × 20 cm. There were no significant differences between the varieties in respect of number of tillers and panicles at the different spacings. Mean grain yields of the 4 new varieties were about 10% above those of the 4 old varieties. Barley varieties used included 10 varieties in 3 groups. The first group contained 10, the second 2 and the third 2 varieties. These groups were differentiated according to yield and also corresponded closely with the age of the varieties, the first group of 10 varieties being the newest and highest-yielding. The varieties were grown at the same spacings as those for the oats. Relative yield values from official trials were 100 for group I, 89 for group II and 80 for group III. Numbers of ears per plant for group I grown at the different spacings in the order given, averaged 2·32, 3·15, 5 and 9·55; for group II, numbers were 2·08, 2·75, 4·27 and 7·74 and for group III, 2·05, 2·53, 3·66 and 6·85, respectively. Tiller numbers did not appear to be consistently correlated with grain yields. From these results, it is concluded that a high number of ears per plant is a highly important factor in barley for producing high yields per unit area. Differences in mean ear numbers between groups I and III increased from 13 to 39% as plant spacing increased from 5 × 5 to 20 × 20 cm. In further trials 3 varieties from group I, Maja, Freja and Fero and 1 from group III, Prentice, were grown at normal plant spacings but received nil, 333, 667 and 1167 kg. $CaNo_3$ per ha. Mean yields for the 3 group I varieties were 34·1, 52·5, 59·1 and 59 hkg. per ha., and for Prentice, 29·3, 40, 47·7 and 49·9 hkg. per ha., respectively, for the different N treatments. Respective numbers of ears per 0·1 $m.^2$ for the group I varieties averaged 56, 75, 91 and 102 and for Prentice, 37, 49, 54 and 55. The plants were prevented from lodging. From these results, it is concluded that it is easier to select for high yields in barley at high, rather than low, nutrient levels and that many modern barley varieties appear to have a high yield potentiality, mainly due to their capacity to produce high ear-numbers per plant, but which cannot contribute fully to the production of high yields, owing to the liability to lodging at high levels of manurial treatment.—P.J.B.

393 Richardson, D. E. and Robinson, D. H. **Joint N.A.A.S./N.I.A.B. spring oat trials, 1949-51.** *J. nat. Inst. agric. Bot.* 1953, **6**, No. 3, 432-42, bibl. 1.

This report deals with nearly 80 trials in England

and Wales which were carried out during the years 1949, 1950 and 1951. The main varieties tested were Sun II (control), Eagle, Star, Opus, Maldwyn and Milford. The trials were laid out in randomised blocks with 6 replications of each variety. Observations were made on maturity, straw length, standing ability and resistance to diseases and pests. Except in the case of Milford, which usually stood best but yielded least, differences between varieties in yield of grain were generally small. There were, however, indications of environmental suitability of some varieties.—Authors' summary.

394 KELLY, A. F. **Spring oat variety trials, 1945-52.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 396-431, bibl. 3.

Trials of spring oats over the period 1945-52 at a total of 30 centres [in Gt Britain] on 21 varieties are reported in detail. Victory was used as the main control, giving place to Sun II for this purpose in the later years: a few trials used Eagle as control. Detailed figures of yield of dry grain as a percentage of the control, and of the husk content are given, together with detailed notes of the field characters and performance of each variety.—Author's summary.

395 KELLY, A. F. **Descriptions of recommended varieties of oats.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 454-5, bibl. 1.

Descriptions are given of the oat varieties Blenda, Clinton, Orion III and Primus.—C.L.S.

396 BRUN, L. H. Forsøk med havresorter 1945-1950. [**Experiments with oat varieties 1945-1950.**] *Forskn. Fors. Landbr.* 1953, **4**, No. 3, 233-78, bibl. 18, English summary pp. 276-7.

The trials reported were conducted at the Voll Experimental Station, near Trondhjem, and at locations in Møre og Romsdal and N. and S. Trøndelag. Twenty-six varieties were included in the trial, 13 of which were tested at the Voll Experimental Station. Meteorological data showed that during the growing season (May-September), mean temperatures were 1·3°C. above normal, with rainfall 12 mm. above normal. Data are given of yield-reliability estimates which showed that Nidar II was 100% reliable (percentage of years in which maturity was reached); Hein, Hein II, N × G 250/42 (Voll variety) and Perle were 96% reliable, while Primus II, Hird, F10 × 435-34, Bambu, Ymer, Tor, Kytø, Strind and Trond were 89% reliable. Ørn and Sol II were the least reliable, respective values being 66 and 74%. Strind was used as a standard variety in all trials. The mean grain yield of Strind in all trials was 365 kg. per decare (0·1 hectare). Kytø, Ørn, N × G 250/42 and Gullregn II gave average yields 18, 11, 10 and 5 kg. per decare more than Strind, respectively. Bambu and Sol II gave yields similar to Strind, while Trond, Hird, Hein II, Tor and Perle gave respective yields 5, 13, 18, 25 and 42 kg. per decare below those of Strind. Gullregn II, Ørn and Sol II gave average straw yields 41, 41 and 38 kg. per decare more than Strind. Perle, N × G 250/42, Kytø and Hein II gave the lowest straw yields. Lodging percentages for N × G 250/42, Hird, Bambu and Kytø were 13, 12, 11 and 7% lower than that of Strind, respectively. At locations other than Voll, Ørn and Trond gave the highest yields, while Nidar II was notably earlier than other varieties, being 16 days earlier than Guldregn II in maturing. Notes are given on the varieties used in these trials and those most suited for growing in the trial district.—P.J.B.

397 WAGENINGEN. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 155. Haver, 1954. [**Choice of varieties. Pamphlet No. 155. Spring oats, 1954.**] *Suppl. 3. LandbVoorl.* 1954, **11**, No. 1, 1-4.

The varieties of spring oat tested in 1953 are classified into groups according to the degree of soil fertility to which they are adapted. Of the varieties recommended for very fertile soils, Abed Minor and Pendek (C.B.1), a very short-strawed variety, gave the best yields. Among varieties suitable for poor sandy soils the variety Flamingsgold was outstanding for its yield.—W.J.B.

398 MURPHY, H. C. **Registration of oat varieties, 17.** *Agron. J.* 1953, **45,** No. 7, 324-5, bibl. 16.

Varieties described are: Mo. 0-200 (Reg. No. 125) and Mo. 0-205 (Reg. No. 126). Mo. 0-200 (C.I. 4626) is a selection from a Columbia × Bond-Iogold cross and is similar to Columbia in agronomic characteristics. It is early-maturing, high-yielding, has a heavy bushel weight and resistance to smut and to crown rust, except Races 45, 57 and 101, and to stem rust, except Races 8 to 10. Mo. 0-205 (C.I. Nos. 4988 and 5323) was selected from a cross Columbia × Victoria-Richland. It is similar to Mo. 0-200 and Columbia in agronomic characteristics, and has a high yield, high bushel weight, early maturity, resistance to prevalent races of crown and stem rust and both types of smut and a wide range of adaptation. Trials during 1947-51 in Missouri are reported, in which Mo. 0-205, Mo. 0-200, Columbia and Clinton gave average grain yields of 59·7, 54·3, 52·0 and 48·9 bu. per ac., had lodging percentages of 17, 37, 30 and 16 and crown rust percentages of 14 ,24, 22 and 40, respectively. —P.J.B.

399 MURPHY, H. C. and others. **The new Clintland oat.** *Iowa Fm Sci.* 1953, **8,** No. 6, 7-8, illus.

Clintland was produced from a Clinton × Landhafer cross and is resistant to all known races of crown rust in the USA, including Race 45. Clintland is almost identical to Clinton in agronomic characters and is resistant to Races 1, 2, 5, 8 and 10 of stem rust. In trials during 1953 at 9 locations in Iowa, Clintland, Clintafe and Clinton gave average grain yields of 55·7, 50·8 and 42·5 bu. per ac., with crown rust infection percentages of 2, 5 and 8, respectively.—P.J.B.

400 HUTCHINSON, J. B. and others. **The kernel content of oats. Comparisons of kernel content and thousand kernel weight for winter and spring varieties.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 443-53, bibl. 6. [Cereals Res. Sta., Res. Ass. Brit. Flour-Millers]

The average kernel content, kernel weight and husk weight of 20 oat varieties were examined. All varieties are affected by environment [see *Fld Crop Abstr.* 6 : 1259] but when these varieties are grown side by side in a block at each of several centres, and preferably for a number of seasons, the variability between the individual results due to variety alone can be assessed. This, in turn, allows the varieties to be ranked in order of merit corresponding to the mean values. For the varieties on the N.I.A.B. Recommended Lists these mean values showed a range of 69·5-78% in kernel content and 20-30 g. in 1000-kernel weight.—C.L.S.

401 GRIFFITHS, D. J. **Varietal resistance and susceptibility of oats to crown rust.** *Pl. Path.* 1953, **2,** No. 3, 73-7, bibl. 7. [Welsh Pl. Breed. Sta., Aberystwyth]

Studies are reported on the resistance of 40 varieties and selections of oats to 8 races of *Puccinia coronata* found in Britain. Only Landhafer (*Avena byzantina*) was resistant to all races. Bond (*A. byzantina*) and the following *A. sativa* varieties: Clinton, Eaton, Santa Fé, Shelby, Tama and Victoria, were highly resistant to almost all races. All the most important varieties of oats grown in Britain were susceptible to all 8 races of crown rust.—P.J.B.

402 BOVIEN, P. Om havreålen (*Heterodera major*) og resultaterne af nogle forsøg på smittet jord. [**Observations on the oat eelworm (*Heterodera major*) and the results of some trials on infected soil.**] *Tidsskr. Planteavl* 1953, **56,** No. 4, 581-91, bibl. 6, English summary pp. 589-90.

Studies in Denmark are reported on the effect of different preceding crops, including oats, timothy (*Phleum pratense*), barley, mangels and perennial ryegrass (*Lolium perenne*), on the incidence of *H. major* on oats. In studies on a number of grass species, it was found that all were attacked to a greater or lesser degree by *H. major*, and that *Ph. pratense* was lightly and *L. perenne* heavily attacked. The different preceding crops were grown for 3 consecutive years before the oat crop was sown. Data are given of the numbers of cysts counted on the roots of 100 oat plants, which show that cyst numbers were high where oats or barley were the preceding crops, but low where mangels, timothy, or ryegrass preceded the oats. Lowest numbers occurred after mangels ; numbers after timothy were lower than those after ryegrass. —P.J.B.

403 ANDERSON, S. Resistens mod havreaal. [**Resistance to oat eelworm.**] *Ugeskr. Landm.* 1954, **99,** No. 4, 43-5, bibl. 3.

An account is given of work done to date in Denmark on the production of barley and oat varieties resistant to oat eelworm [*Heterodera major*]. In one series of trials with 8 barley varieties during 1952-3, Fero, Alfa and Drost had markedly lower numbers of eelworm cysts on the roots than Maja, Rigel, Carlsberg, Ymer and Rex II. Among oat varieties, Ørn and Opus had relatively low numbers of eelworm cysts in 1952, while Stand, Rex and Minor had the greatest numbers. In 1953, eelworm cyst numbers were in all cases markedly lower than in 1952, so that no clear varietal differences could be established. In another trial in 1952, the barley varieties Fero and Drost again had very low eelworm cyst numbers, compared with Maja, Freja, Ymer and Herta. Kron had eelworm cyst numbers only slightly greater than those of Fero and Drost. No comparison between eelworm-resistant oat and barley varieties could be made.—P.J.B.

404 ROSS, W. M. **Studies on earliness in *Avena sativa.*** *Rep. Ill. agric. Exp. Sta. 1950-2* 1953, 47.

In studies during 1950-1 on 14 varieties of oats, there were fewer days required from sowing to panicle initiation in early than in late varieties. Days required ranged from 30 for the earliest, to 38 for the latest varieties in 1950 ; in 1951, respective values ranged from 23 to 30 days. Days from panicle initiation to heading ranged from 33 to 47 in 1950, and 30 to 47 in 1951. Growth rates of early and late varieties, as indicated by leaf counts, were essentially similar in early and late varieties. The earliest variety tested had an average of 3·8 leaves at 24 days old, 4·4 leaves at 27 days and 5·4 leaves at 30 days old ; in the case of the latest variety, respective numbers were 3·7, 4·5 and 5·2 leaves. Time of panicle initiation was the essential difference between early and late-maturing varieties. There was a highly significant positive correlation between internode numbers and days required from sowing to panicle initiation.—P.J.B.

405† TURKOVA, N. S. and LIEPINJA, G. R. [**Lodging in grasses under the influence of respiration poisons.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **93,** No. 1, 183-4, bibl. 5. [Moscow State Univ.]

[See also *Herb. Abstr.* 15 : 324.] In order to study the nature of lodging, investigations were made into the reaction of the grass stem (oats and barley) to the influence of carbon monoxide and hydrogen sulphide. Under the conditions of the test (growing conditions being comparable with those in the field), there is evidence that the respiration poisons produce curvature of the stems at the nodes in oats (var. Dippe) and barley (var. Viner). It is concluded that, in lodging, a significant role is played by epinastic curvature of the stems, the curvature resulting from certain changes (in metabolic processes) which are induced by interruption of the normal functioning of the respiratory system when the plants are subjected to the poisons.—M.H.

406 McKinney, H. H. and others. **Certain factors affecting chlorophyll degeneration and pigmentations in oats and other grasses.** *Pl. Dis. Reptr* 1953, **36,** No. 12, 450-8, bibl. 10. [Received 1953] [Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

Observations are made on the effect of light, temperatures, mineral nutrition, soil pH, aphid infestation and acid burning, on chlorophyll degeneration and the formation of anthocyanin pigments in oats and a number of other Gramineae. Improvement of the manurial status of soils appeared to be the most effective method of preventing early chlorophyll degeneration in oats. Oats were more variable than wheat in their expression of anthocyanin pigments and there was considerable varietal difference in this respect in oats. There were indications that many oat varieties had relatively exacting nutritional requirements for the maintenance of their chlorophyll status.—P.J.B.

407 Frey, K. J. **Effects of variety and location on thiamine, pantothenic acid, riboflavin, and niacin contents in oats.** *Quart. Bull. Mich. agric. Exp. Sta.* 1953, **36,** No. 1, 13-17, bibl. 10.

Studies on 5 oat varieties, Andrew, C.I. 5298, Clinton, Eaton and Huron, grown at 4 locations in Michigan, showed the feasibility of producing oat varieties with high contents of thiamine, pantothenic acid, riboflavin, or niacin, since heredity was the main determining factor. Environmental effects appeared to be largely additive and affected all varieties similarly. C.I. 5298 had the highest and Andrew the lowest content of thiamine, pantothenic acid and niacin.—P.J.B.

408† Evers, A. and Sonneveld, A. Graszaadteeltproeven. De invloed van verschillende zaaisystemen met dekvrucht (haver) op de opbrengst van de dekvrucht en de ontwikkeling van de ondervrucht. [**Grass seed production trials. The influence of different sowing systems, using oats as a nurse crop, on the yield of the nurse crop and the development of the grass.**] *Gestencilde Meded. 12. Cent. Inst. Landbouwk. Onderz.* 1953, 27-34, illus., English summary p. 48.

Eight different systems of sowing red fescue [*Festuca rubra*], meadow fescue [*F. pratensis*] and cocksfoot [*Dactylis glomerata*] under a cover crop of spring oats, in which the row width of the grasses varied from 40 to 60 cm. and the row width of the oats from 16·6 to 50 cm., were tested in trials laid down in 1952. The rows ran north to south. Among the 8 lay-outs tried were two in which one row of grass alternated with two rows of oats. The yields of the cover crop grown under each system are tabulated. The best yields of oats were obtained where two rows of oats 20 cm. apart were enclosed between rows of grass 60 cm. apart. The autumn development of the grass grown under this system was good.—W.J.B.

409 Gilchrist, J. A. and Picken, Grace. **Oat crop costings, 1952.** *Rep. 11. W. Scot. Coll. Agric. Econ. Dep.* 1953, pp. 11.

Costings from 50 oat crops were analysed. The average yield of grain per acre, over the 472 costed acres, was 26 cwt. The average cost per ton of threshed grain, after giving credit for straw, was £17 12s. calculated on a yield of 26 cwt. grain per acre. This cost included an estimated charge of £4 14s. per ton for overhead expenses. The average cost per acre, including threshing, but before crediting straw, was £26 7s. This cost included an estimated charge of £6 4s. per acre for overhead expenses. On the average acre, it took 43 man-hours to handle the crop from the preliminary ploughing until the completion of threshing. Labour costs represented one-fifth of the cost of growing and threshing the crop.—From authors' summary.

## BARLEY

(See also Abs. 697.)

410 Mulligan, T. E. and Travers, S. J. **Joint N.A.A.S./N.I.A.B. trials of spring barley varieties, 1949-51.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 461-7, bibl. 2.

Twenty-nine trials of spring barley varieties during 1949-51, at 19 centres, conducted jointly by the NIAB and the NAAS, are reported. The main varieties included Kenia, Freja, Spratt-Archer and Plumage-Archer. Camton, Earl, Ymer and Carlsberg were included at from 1 to 4 trials each. The order of ripening was Freja first, Kenia, Spratt-Archer and Plumage-Archer with an average 2, 6 and 2 days between them, respectively. Average lengths of straw were Freja 22 in., Kenia 25 in., Spratt-Archer 31 in., and Plumage-Archer 34 in. Freja, although shorter in the straw, stood rather less well than Kenia or Spratt-Archer. Freja gave the highest yield of grain; Kenia and Spratt-Archer yielded very similarly, and Plumage-Archer gave the lowest yield.—Authors' summary.

411 WAGENINGEN. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 154. Zomergerst, 1954. [**Choice of varieties. Pamphlet No. 154. Spring barley, 1954.**] *Suppl. 2. Landb-Voorl.* 1954, **11,** No. 1, 1-4.
The results are given of comparative trials carried out with spring barley varieties in the Netherlands in 1953. Of the three malting varieties tested, Balder, Piroline and Kenia, the last named gave the lowest and Piroline the highest yields on most soils. Kenia is suitable for soils whose structure is damaged by sea water. There is some doubt whether the straw of Piroline is sufficiently stiff for the most fertile soils.—W.J.B.

412 JOHNSON, I. J. **Registration of barley varieties.** *Agron. J.* 1953, **45,** No. 7, 320-3, bibl. 5.
Varieties described are: Edda, Kenbar, Harbine, Mo. B-400, Dicktoo and Kearney (Reg. Nos. 19-24, respectively). Edda was introduced from Sweden for Alaskan conditions, in which it has considerably outyielded Olli in trials during 1946-50 at 2 locations. The remainder of the varieties are all bearded, 6-rowed, rough-awned, winter barleys. Kenbar [see also *Fld Crop Abstr.* 6 : 60] is adapted to Kentucky and is resistant to 5 races of loose smut (*Ustilago nuda*). Compared with the standard varieties, Jackson I and Kentucky I, it has a higher grain yield, greater straw strength, shorter plant height and matures 5-8 days earlier. Harbine is adapted to Oklahoma. It has short straw, high resistance to lodging and is particularly adapted to combine harvesting. Mo B-400 [see also *Fld Crop Abstr.* 6 : 61] is adapted to central and southern Missouri and has a high grain yield, strong straw, winter hardiness in Missouri and rapid growth, by reason of which it is well suited for winter grazing. Dicktoo is adapted to Nebraska and is very winter-hardy. Its malting quality has not been entirely satisfactory. Kearney is also adapted to Nebraska, where it is very winter-hardy and has good malting quality.—P.J.B.

413 ARGENTINA. Ministry of Agriculture. Una nueva variedad de cebada forrajera "Guatraché Araucana M.A.G." difundirá la Estación Experimental Eva Perón. [**Guatraché Araucana M.A.G., a new variety of forage barley bred and distributed by the Eva Perón Experimental Station.**] *Idia* 1953, No. 62, 21. [Eva Perón Exp. Sta. Guatraché, Argentina]
The new variety of forage barley, Guatraché Araucana M.A.G., in addition to giving good yields of forage, gave higher average yields of grain (2085 kg. per ha. in 1948-52) than other varieties tested. It is resistant to smut diseases and to drought and frost. The new variety is recommended for use in the following Provinces: Eva Perón, western and southern Buenos Aires and southern Cordoba.—W.J.B.

414 AYERS, A. D. **Germination and emergence of several varieties of barley in salinized soil cultures.** *Agron. J.* 1953, **45,** No. 2, 68-71, bibl. 8. [U.S. Salinity Lab., Riverside, Calif.]
Data are given of the germination of 30 varieties of barley of world-wide origin, in soil containing different amounts of NaCl. California Mariout was the most tolerant variety to salt, with germination percentages of at least 50 in osmotic pressures of 20 atmospheres. Si (Egyptian), Santoku (Japanese), Lyallpur (Indian), Corbel (Chinese), Gopal (Indian) and Asplund (Norwegian) had not less than 50% germination in osmotic pressures of 18-19 atmospheres. Hank (Egyptian), Campana (hybrid) and Arivat (hybrid) had the lowest tolerance to salinity, with germination percentages of not less than 50 at osmotic pressures of 12 atmospheres.—P.J.B.

415 PERRIER and RADISSON. Lutte contre le charbon couvert de l'orge (*Ustilago hordei* Pers.) Lagerh. [**The control of covered smut (*Ustilago hordei* (Pers.) Lagerh. on barley (in Morocco).**] *Terre maroc.* 1953, **27,** No. 286, 292-3.

416 MEHTA, P. R. and others. **Varietal reaction to covered smut of barley.** *Sci. and Cult.* 1953, **19,** No. 5, 262-3, bibl. 2. [Lab. Pl. Path. Kanpur, India]
Experiments carried out in 1949-53 in Uttar Pradesh to test the resistance of 20 barley varieties to covered smut (*Ustilago hordei*) are summarized. Grain was infected by soaking in water containing 2 g. smut spores per 100 c.c. of water. The varieties K12, C84 and CN294 were classified as resistant (less than 2% infection) as a result of the experiments. The two most susceptible varieties NP21 and C259 (over 20% infection) are among the most widely grown in Uttar Pradesh.—W.J.B.

417 MEHTA, P. R. **Varietal reaction to stripe disease in barley.** *Sci. and Cult.* 1953, **19,** No. 3, 152, bibl. 1. [Pl. Path. Lab., Kanpur, India]
As a result of trials in 1950-3 in which 21 different barley varieties were grown from artificially infected grain, the varieties were divided into 5 different categories of resistance to leaf stripe (*Helminthosporium gramineum*). Three varieties, K12, CN292 (a huskless high-yielding variety) and 42/72 were highly resistant.—W.J.B.

418 Halverson, A. W. and Olson, O. E. **The protein composition of barley grown in South Dakota.** *Tech. Bull. 13. S. Dak. agric. Exp. Sta.* 1953, pp. 18, bibl. 8.

Data are presented of the total protein, glutelin N, hordein N and salt-soluble N content of Feebar, Odessa and Plains barley, over a 3-year period and at different locations in S. Dakota. It was considered that a reasonably accurate prediction of the composition of the protein of barley could be made, where the total N content was known.—P.J.B.

419 Wright, K. E. and Donahue, Barbara A. **Aluminium toxicity studies with radioactive phosphorus.** *Pl. Physiol.* 1953, **28,** No. 4, 674-80, bibl. 11, illus. [Dep. Bot., Smith Coll., Northampton, Mass.]

Barley plants were grown in culture solutions with and without aluminium and then transferred to similar culture solutions to which radioactive P had been added. Microscopical examination showed that there was a considerable modification of internal structure. This modification and the distribution of Al and P afforded further evidence in support of the general thesis that Al does inactivate P, primarily within the roots of the plant, and thus interferes with the normal P metabolism of the plant.—From authors' summary.

420 Bould, C. and others. **Radiation effects with radioactive phosphorus in barley and tomato grown in soil.** *Pl. and Soil* 1953, **5,** No. 1, 36-53, bibl. 17. [Res. Sta., Long Ashton, Bristol]

Observations are reported on the growth of barley and tomato plants grown in pots and receiving 200 or 500 lb. superphosphate per ac., containing $P^{32}$ in amounts such as to give radiation activities of 0·5 to 500 microcuries per 2 kg. soil. Sporadic effects of radiation on plant growth occurred at all levels of $P^{32}$ activity, though in no case were the effects such as to cause a deviation of more than 15% from untreated controls. The main P treatment effects were larger than the $P^{32}$ radiation effects and were not sufficiently great to preclude the use of $P^{32}$, though the need to take radiation effects into account is stressed.—P.J.B.

421 Nikitenko, G. F. [**The comparative effectiveness of certain methods for increasing the vitality of cereal crops.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **92,** No. 3, 681-3, bibl. 14. [Mordovsk State Select. Sta., Saransk]

The methods studied, in order to compare their relative merits, were: inter-varietal crossing, autumn sowing and inter-varietal grafting. The work was carried out on *Hordeum distichum* var. *nutans* (type Kazanskiĭ 6/4).—M.H.

422 Northern Ireland. Agricultural Research Institute. **Twenty-sixth Annual Report, 1952-3.** *Agric. Res. Inst. N. Ire.* Hillsborough, pp. 23.

The value of different varieties for producing high yields of feeding barley and the effect of relatively heavy N applications in increasing yields without lodging were tested in 1952. The main part of the experiment was designed to test the 4 varieties, Abed Kenia, Freja, Herta and Ymer at 4 levels of N manuring, namely 0, 0·75, 1·5 and 2·25 cwt. ammonium sulphate per acre; in addition there was one plot of Spratt Archer at each manurial level. Under conditions of high fertility, Spratt Archer lodged badly at all manurial levels, but the Scandinavian varieties withstood large dressings of N without lodging. Herta, at the highest level of manuring, yielded over 40 cwt. per acre and gave increased yields of 4·8 cwt. of grain for each addition of 1 cwt. ammonium sulphate.—M.A.

423 Franck, O. Gödslingseffekten på hormonbehandlad jord. [**The fertilizing effect of manure and mineral fertilizers in soils treated with growth-regulating compounds.**] *Medd. 44. Stat. Jordbruksförsök* 1953, pp. 16, bibl. 7, illus.

Data are given on the manurial effect of Agroxone J applied at a rate of 40 l. per 600 l. water per ha. on the yield of barley and white mustard [*Sinapis alba*] grown on acid peat-loam, acid clay and weakly acid (pH 6·5) loam soils receiving farmyard manure, mineral fertilizer (NPK), or no manure, combined both with and without lime. The herbicidal treatment had a positive effect on the yields of both crops on all soil types whether lime was, or was not, applied. The effect of manurial treatments was greater on plots treated than on plots not treated with herbicide during the same year as the herbicide was applied. This did not apply in the case of barley grown on the loam soil, which had a relatively high P status.—P.J.B.

## MAIZE

424 Videla, R. O. Cultivo del maíz en el sudoeste de las provincias de Buenos Aires y Eva Perón. [**Maize growing in the southwest of Buenos Aires and Eva Perón Provinces.**] *Bol. Prod. Fom. Agric.* 1953, **4,** 37, 16-21. [Esta. Exp. Bordenave, Argentina]

425 Becker, W. R. Het standruimte-onderzoek bij hybride-maisrassen (Project 207). [**Spacing and population studies with hybrid maize.**] *Verslag. Cent. Inst Landbouwk. Onderz. 1952* Wageningen, 1953, 139-43, illus., English summary p. 143.

Experiments to determine the optimum spacing for hybrid maize grown for grain were carried out in the Netherlands on sandy and clay soils in 1951-2. Plant spacings varying from 5 to 10 plants per sq. m. and row widths of 67 and 100 cm. were tested. Differences in row width had little effect on yield. In general, a spacing of 7 plants per sq. m. gave the highest yields.—W.J.B.

426 Fulton, J. M. and Webber, L. R. **Soil porosity and corn yields under nine three-year rotations.** *Canad. J. agric. Sci.* 1953, **33,** No. 5, 494-9, bibl. 11. [Domn. Exp. Sta., Harrow, Ontario]

The trials reported were carried out in the Province of Ontario. No definite relationship was found between soil porosity and maize grain yields under 9 different rotational systems. Data are given of maize yields during 1951 under the different rotations. Plots received (a) nil, (b) 4000 lb. lime per ac., (c) 300 lb. 2-12-10 (NPK) manure per ac., and (d) 4000 lb. lime + 300 lb. 2-12-10 (NPK) manure per ac. Maize yield means for all rotations for treatments (a), (b), (c), and (d) were 34·8, 40·2, 41·3 and 47·2 bu. shelled grain per ac. The highest yield, 48·8 bu. grain per ac., was produced by a maize/oats/lucerne rotation, which was significantly more than the yield of 5 out of 9 rotations, and almost significantly more than the yield of the remaining 3 rotations. A maize/soyabean/oats + sweet clover [*Melilotus alba*] rotation produced average maize yields of 33·7 bu. per ac., while a maize/maize/oats + sweet clover rotation produced the lowest average of 31·9 bu. maize per ac.—P.J.B.

427 Andharia, R. M. and others. **Nitrogen status of Marshall silt loam as influenced by different crop rotations.** *Proc. Amer. Soc. Soil Sci.* 1953, **17,** No. 3, 247-51, bibl. 8, illus. [Iowa Agric. Exp. Sta., Ames]

The rotations used included the following crops: maize, oats, pasture, and oats undersown with sweet clover [*Melilotus alba*]. A sweet-clover catch-crop was less effective than a grass/legume mixture in maintaining the organic matter and N content of the soil. There was a significant positive correlation between the total N content of the soil and maize-grain yields. Maize yields from rotations of maize/oats, maize/oats + sweet clover, maize/oats/pasture and maize/oats/ 2 years' pasture were 46, 68, 99 and 104 bu. per ac., respectively, with associated soil N contents of 0·146, 0·151, 0·169 and 0·159%. It was concluded that, in general, total soil N content, in itself, was not the primary factor determining the capacity of the soil used to supply N to maize. A highly significant positive correlation was found between the N content of the 6th leaf of maize plants and maize yields. A less highly significant positive correlation was found between the N released by the soil over a 2-week incubation period and maize yields.—P.J.B.

428 Jugenheimer, R. W. and Silow, R. A. **Results of comparative hybrid maize tests in European and Mediterranean countries—1951.** *Devel. Pap. 35. FAO* 1953, pp. 145.

This is a continuation of the work reported in *Fld Crop Abstr.* 6 : 1283.—P.J.B.

429 Molotkovskiĭ, G. H. and Gluskina, B. G. [**The effect on growth and yields of soaking maize seed in warm water.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **92,** No. 3, 679-80, bibl. 5.

During 1950, tests were made with the dent maize variety 3135, bred at the Černovick Experimental Station, and in 1951, with the variety Sibirjačka. The seed was placed in gauze bags which were put in vessels containing water heated to 30, 40, 50 and 60°C., respectively. Control vessels contained water maintained at room temperature (18°C.). The soaking lasted for 5-6 hr., i.e. until the water in the vessels cooled to room temperature. The seed was then sown. In the 1951 experiments with the Sibirjačka variety, the seed was divided into 2 groups after heating, one part being grown in the laboratory and the other sown in experimental field plots. In 1950 the size of the plots was 50m.$^2$ with "a nutritional area of 70 × 30 cm." The replication was 4-fold. In 1951 the plants were grown in 10m.$^2$ plots with the same nutritional area as in the 1950 test. The variety 3135 when soaked gave an increased yield per plant (compared with the control) of 11% at a temperature of 30°; 31% at 50°; and 23% at 60°. Yields of Sibirjačka, when treated, increased over those of the control from 7% at 30° to 25% at 50° and 42% at 60°. There is also evidence that seedlings from warmed seed [of both varieties] developed earlier, percentage emergence (on 27 June) being: control, 42·7%; at 30°, 52·2%; at 40°, 70%; at 50°, 71·4%; and at 60°, 100%. Analyses were made of the chlorophyll and ascorbic acid content and the catalase activity in leaves of the 15-day old seedlings [both vars.]. Chlorophyll was determined by the photoelectrocolorimeter FEK-2; ascorbic acid by Prokošev's method; and catalase activity by the gasometric method. An increased activity was recorded in physiological functions as a result of heating the seed, e.g. the accumulation of chlorophyll increased from 10·2 (mg.%/100 mg. crude weight of leaves) for the control, to 11·7 when heated at 60°. The content of vitamin C (in mg.%/ crude weight of leaves) increased from 9·3 (control) to 12·4 (at 60°). There is an indication that stem growth and root growth in seedlings are increased by warming the seed, but the ratio of stem/root increase is not uniform at the different temperatures.—M.H.

430 Josephson, L. M. **Use of second generation**

**"topcross" hybrid seed.** *Fmg in S. Afr.* 1953, **28,** No. 330, 322.

Despite reduced yields, second generation "topcross" (inbred variety cross) hybrid maize seed was superior to seed from 7 ordinary varieties tested in experimental trials conducted by the Potchefstroom College of Agriculture.—M.A.

431 Stryckers, J. and Slaats, M. Herbiciden in hybriedmaïs. [**Weed control in hybrid maize.**] *Meded. LandbHogesch. Gent* 1953, **18,** No. 2, 439-54, English summary p. 453.

Applications of 0·5% DNOC $NH_4$ salt [rate per ha. not given] and 1 kg. per ha. acid equivalent of 2,4-D Na and triethanolamine salt and MCPA Na salt were made during 1952 to Wisconsin 240 hybrid maize at the following growth stages: emergence, about 5, 8-10, 13-15, about 20 and about 25 cm. high. Plant height was measured from ground level to the point on the stem where the top leaves divided. Respective leaf numbers at these plant heights were: nil, 3, 4-5, 6-7, 7-8 and 8. The plot soil was a sandy loam. Applications of DNOC at emergence and when the maize was 5 cm. high (8 and 15 May, respectively) resulted in complete control by 13 June of *Matricaria chamomilla, Papaver rhoeas, Polygonum persicaria* and *Chenopodium album* and a considerable degree of control of *Cirsium arvense.* Treatments with 2,4-D amine gave good control of *M. chamomilla, P. rhoeas* and *C. album.* The Na salts of 2,4-D and MCPA were inferior to 2,4-D amine and DNOC in controlling these weeds. DNOC severely burned the leaves of maize sprayed when 10 cm., or more, high. Brace root proliferation, reduced grain yield and plant height, and delayed maturity were caused in plants sprayed when 15, 20, or 25 cm. high. Least plant injury at harvest time was caused by DNOC. In preliminary trials with CMU, applications of 25 and 50 kg. per ha. caused complete eradication of vegetation, including *Poa annua* and *Lolium perenne,* from treated areas for at least 1 year.—P.J.B.

432 Whitmore, T. S. and others. **Weeds: major menace to crop production.** *Fmg in S. Afr.* 1953, **28,** No. 330, 293-7, illus.

An experiment begun at Rietvlei Research Station, near Pretoria, was designed to investigate the factors concerned in the use and dissipation of moisture by the maize crop, and to seek means for increasing maize yields by conserving, or making better use of, the available soil moisture. The effects of weeding and fertilizer treatments on the maize crop were examined, the treatments being as follows: no manure, weeds left; no manure, weeds controlled; manured, weeds left; manured, weeds controlled. In order to study how the maize crop reacted to weed competition when the supply of available moisture was more abundant, the following treatments were also included: unmanured, weeds controlled, mulched; manured, weeds left, mulched; manured, weeds controlled, mulched. The mulch consisted of a 3″ gravel layer. Fertilizer dressings were heavy and consisted of 1000 lb. superphosphate per morgen [2.1165 ac.] initially and 150 lb. ammonium sulphate per morgen about 2 months after sowing. Where unmanured plots were kept free of weeds, maize grain accounted for 36% of the total weight of maize plants; on weed-infested plots, the grain yield was only 12% of the total production. Application of fertilizers increased the total production of plant material by about 70%, but unmanured plots which were weeded produced more grain per morgen than manured plots which were unweeded. Where moisture was conserved but fertilizer withheld, grain yields were approximately equal to the yield obtained with heavy dressings of fertilizer where moisture supply was reduced by evaporation (weeds being suppressed in both cases). The adverse effect of weed competition on the growth of the crop was also shown in the slow growth and delayed maturity of the maize plants.—M.A.

433 Irving, E. M. and Smith, O. F. **Helminthosporium leaf blight of corn in Guatemala.** *Turrialba* **3,** No. 1-2, 14-22, bibl. 7, illus.

The resistance of Guatemalan Early, Coast, Mountain and Giganteum groups of varieties and of United States varieties of maize to leaf blight (*Helminthosporium turcicum*) was tested in the Guatemalan highlands, at altitudes of 3000-6000 ft., a zone specially favourable to the development of the disease. On the whole, varieties of the Giganteum group were the least, and the United States varieties the most, susceptible to the disease.—W.J.B.

434 Baldoni, R. Prove di lotta diretta contro la piralide e la sesamia del mais. [**Trials on direct control of the European corn borer and corn stalk borer on maize.**] *Ann. Sper. agr.* 1953, **7,** No. 6, 1829-51, bibl. 63, illus., English summary p. 1848. [Ist. Agron. Univ. Bologna, Italy]

In trials carried out in Italy in 1951-2 there was a considerable advantage from controlling *Pyrausta nubilalis* and *Sesamia cretica* by DDT and Parathion treatment on late maize crops, especially when grown immediately following wheat, while the advantage was small with normal, early maize crops for which chemical control is considered inadvisable. The treatments recommended for late maize crops are: 1 or 2 applications of 50% wettable DDT in 0·4% aqueous solution, or 2 or 3 applications of 28% Parathion in 0·1% solution, both preparations applied in about 10 hl. of water per ha. The best time of treatment on the Adriatic Coast is from 20 July to 10 August.—E.B.O.

435 Jeffreys, M. D. W. **Pre-Columbian maize in Africa.** *Nature, Lond.* 1953, **172,** No. 4386, 965-6, bibl. 10. [Univ. Witwatersrand, Johannesburg, S. Afr.]

" While accepting the American origin of maize, the question of its existence in Europe before the days of Columbus has been revived by recent archaeological finds in Yoruba territory [Nigeria]."

436 Reeves, R. G. **Comparative morphology of the American Maydeae.** *Bull. 761. Tex. agric. Exp. Sta.* 1953, pp. 26, bibl. 20, illus.

Comparative data are presented of 23 morphological characters of teosinte, maize and *Tripsacum dactyloides*. The results confirmed previous views that teosinte was derived from hybridization between primitive types of maize and *T. dactyloides*.—P.J.B.

437 Nickerson, N. H. **Variation in cob morphology among certain archaeological and ethnological races of maize.** *Ann. Mo. bot. Gdn* 1953, **40,** No. 2, 79-111, bibl. 83. [Henry Shaw Bot. Sch., Washington Univ.]

Internal and external morphological characters of over 500 cobs of modern and archaeological maize varieties were measured. Characters studied included: shape of ear, shank diameter and row number and the following internal characters: width of lower glume, height of rachis flaps, depth and width of cupule and thickness of kernel. Pictorialized scatter diagrams are given showing the variation and relationships of these characters within each group of maize cobs studied. Cob analysis appeared to be a valid basis for characterizing variation between maize races.—P.J.B.

438 Bonnett, O. T. **Developmental morphology of the vegetative and floral shoots of maize.** *Bull. 568. Univ. Ill. agric. Exp. Sta.* 1953, pp. 47, bibl. 62, illus.

439 Villax, E. and Mascarenhas, G. H. N. Notas ácerca das inflorescências, floração e fecundação do milho. [**Notes on the inflorescences, flowering and fertilization of maize.**] *Melhoramento* 1953, **6,** 116-47, bibl. 35, illus., English summary pp. 142-4. [Pl. Breed. Sta., Elvas, Portugal]

440 Hay, R. E. and others. **Concentration and translocation of nitrogen compounds in the corn plant (*Zea mays*) during grain development.** *Pl. Physiol.* 1953, **28,** No. 4, 606-21, bibl. 36. [Dep. Agron., Univ. Illinois, Urbana]

The purpose of this investigation, carried out in 1945, was: (1) to determine whether N in the vegetative parts of the corn plant at pollination is adequate to supply the maturing grain; if not, the contribution of soil N to the overall N supply after pollination and (2) to determine to what extent certain N compounds in the stalks and leaves at pollination contribute to the N of the maturing grain. Two hybrid maize varieties, U.S. 13 and Funk's G-180, were grown. As a general rule, the percentage of total N decreased in all vegetative parts of the maize plant from pollination to maturity. Just after pollination there was enough N in the maize plant to supply the grain completely, if it could have been translocated. Approximately 60% of the grain N was contributed by the vegetative parts of the plant and 40% by the soil and roots after the maximum accumulation of N in the plant parts had taken place, shortly after pollination. The study of water-soluble N compounds of U.S. 13 showed that, during grain maturity, the residual N showed the greatest loss from the upper and lower leaves, followed by nitrate N. The nitrate N showed the greater loss from the upper and lower stalks, followed by the residual N. Plant proteins and the N compounds more complex than amino acids contributed the major portion of N to the maize grain.—M.A.

441 Harris, W. E. **Effect of five antibiotics in varying concentrations on growth of young corn plants.** *Butler Univ. Bot. Stud.* 1953, **11,** Pap. No. 1-7, 71-86, bibl. 13.

Applications of 5 ppm. concentrations of potassium penicillin to the soil in which maize seedlings were grown, resulted in a 40% increase in the dry weight of the plants, while 5 ppm. concentrations of procaine penicillin inhibited growth, compared with untreated controls. The specific effect of potassium or procaine on the plants was not determined. Bacitracin, streptomycin sulphate and erythromycin had no appreciable effect on plant growth. The antibiotics were applied to pots as 25 ml. solutions, 4 times per week for a period of 4 weeks. —P.J.B.

442 Gausman, H. W. **Some effects of certain plant growth substances and carbonic and thiocarbonic acid derivatives of hydrazine on maize.** *Rep. Ill. agric. Exp. Sta. 1950* 1953, 43-4.

Attempts were made to influence the reproductive development of maize plants by treating them with growth substances. Concentrations of 2000 ppm. naphthaleneacetic acid, made to hybrid WF9 × 38-11 maize plants before tassel differentiation, delayed pollen shedding and silking by maximum of 3 and 4 days, respectively, withou affecting grain yields. With hybrid WF9 × Hy2 similar treatments did not delay pollen shedding or silking. With WF9 × 38-11, but not WF9 × Hy2, 2,3,5-triiodobenzoic acid, applied durin tassel differentiation and reduction division, significantly increased tillering. 2,4-D was mos effective, followed by 2,3,5-triiodobenzoic acid and naphthaleneacetic acid, in increasing the number of silked ears on hybrid WF9 × 38-11. Maleic hydrazide was not effective as a means of causing pollen sterility. Of several carbonic and thiocarbonic derivatives of maleic hydrazide, none delayed pollen shedding and silking.—P.J.B.

443 BREAZEALE, E. L. and McGEORGE, W. T. **Influence of atmospheric humidity on root growth.** *Soil Sci.* 1953, **76**, No. 5, 361-5, bibl. 5. [Arizona Agric. Exp. Sta., Tucson]

Experiments, using maize and tomato plants, were carried out to determine the effect on root elongation of transferring the plants from air with 2% relative humidity to air with 93% R.H., and vice versa. Root elongation was increased to a highly significant extent by transferring the plants from low to high relative humidities. Increase in root elongation was greater where the plants were transferred from low to high relative humidities, than where the plants were transferred from ambient relative humidities in the laboratory to conditions of 93% R.H. The fact that water absorbed via leaves stimulates root growth under arid conditions is considered to account for the differences between plant growth response to rainfall and to irrigation. Sprinkler irrigation, by raising the relative humidity of the air surrounding the above-ground parts of plants, is thought to favour root growth more than conventional methods of irrigation.—P.J.B.

444 HARROLD, L. L. **Available moisture for crops.** *Agric. Engng, St. Joseph, Mich.* 1954, **35**, No. 2, 99-101. [Agric. Res. Serv., U.S. Dep. Agric., Coshocton, Ohio]

Data are given showing the extraction of soil moisture at different depths by maize, together with the moisture content of soils: (a) under irrigation, (b) following rainfall and (c) where no irrigation water was applied.—P.J.B.

445 BONNET, J. A. and LUGO-LOPEZ, M. A. **Effect of different quantities of velvet bean green manure on corn yields in Puerto Rico.** *J. agric. Univ. P.R.* 1953, **37**, No. 1, 96-101, bibl. 2.

Velvet beans (*Stizolobium deeringianum*) were grown in field trials on Fajardo and Catalina clay and received 100 lb. $P_2O_5$ and 4 tons ground limestone per ac. On the Catalina clay, nil, 5 and 10 tons of velvet-bean green manure per ac. were either mulched, or ploughed under, before a crop of maize receiving 240 lb. $K_2O$ per ac. was grown. Where nil, 5 and 10 tons green manure were applied as a mulch, shelled maize yields were 4, 15·6 and 16 cwt. per ac., respectively. Where nil, 5 and 10 tons of green manure were ploughed in, respective yields were 1·5, 16·6 and 20·6 cwt. per ac. There were no residual effects of the green-manure treatments on the Catalina clay after one maize crop had been taken. On the Fajardo clay, nil, 5, 10 and 20 tons green manure were applied as a mulch, or ploughed under. No significant maize-yield increases followed any green-manure treatment. This was thought to be due to the high N and organic-matter status of this soil.—P.J.B.

446 ANTONIANI, C. and others. Ricerche sulla composizione chimica e sul valore nutritivo di diversi tipi di mais coltivati in Italia. Nota preliminare. [**Investigations into the chemical composition and nutritive value of different maize types grown in Italy. Preliminary note.**] *Ann. Sper. agr.* 1953, **7**, No. 6, 1807-22, bibl. 122, English summary p. 1815. [Sta. Sper. Freddo, Milano]

447 FAO. **Maize and maize diets. A nutritional survey.** *Nutr. Stud. 9. FAO* 1953, pp. 94, bibl. 173.

Among aspects reviewed are: the nutrient content of maize; the effect of milling, cooking and storage methods on the nutritive value of maize; the association between pellagra incidence and maize diets; the improvement of the nutritive value of maize and maize diets.—P.J.B.

## MILLET AND SORGHUM

448 PAINTER, C. G. and LEAMER, R. W. **The effects of moisture, spacing, fertility and their interrelationships on grain sorghum production.** *Agron. J.* 1953, **45**, No. 6, 261-4, bibl. 1. [New Mexico Agric. Exp. Sta., State College]

Studies in New Mexico on Springer fine sandy loam were carried out to determine the effect of a number of treatments on sorghum grain yields. The treatments included the following: (a) soil moisture tension at 9 in. depth held below 0·7 atmospheres during growing season, (b) soil moisture tension allowed to reach 12-15 atmospheres before irrigation, except during heading. These treatments were combined with plant spacings of 4 and 9 in. within the row, in rows 36 in. apart, and with 6 different combinations of NP treatment, including up to 240 lb. N and 80 lb. $P_2O_5$ per ac. Highest grain yields of 102 bu. per ac. were obtained from a combination of the highest rate of NP treatment, 4 in. spacing in the row and irrigation to maintain a soil moisture tension of less than 0·7 atmospheres. Lowest yields in all cases were associated with no N treatments. Yield differences due to soil moisture tension, manurial treatment and plant spacing and soil moisture × manurial treatments and plant spacing × manurial treatments were all significant. Soil moisture ×

plant spacing and soil moisture × plant spacing × manurial treatment interactions were not significant. Irrigation treatment (a) resulted in average grain yields 5·4 bu. per ac. higher than those following treatment (b); 4 in. spacing in the row resulted in average yields 5 bu. per ac. higher than those where 9 in. spacing was used. 80 lb. $P_2O_5$ per ac. with no N treatment gave small yield increases compared with where no P was applied; 40 lb. $P_2O_5$ + 60 lb. N per ac. resulted in yields 6·5 bu. per ac. higher than where N, only, was applied. N had a greater effect than P in raising grain yields. Yield increases from the treatment involving frequent irrigation (a) were not obtained unless N was also applied. Heading was most rapid where N was applied; P had some effect in hastening heading, but this was only significant in the presence of N. Plants grown under irrigation treatment (b) and at a spacing of 4 in. in the row were much later in heading than those grown under the other irrigation and plant spacing treatments. —P.J.B.

449 Garland, K. R. **Broom millet in the north-west irrigation areas** [**of Victoria**]. *J. Dep. Agric. Vict.* 1953, **51,** Pt. 10, 443-8, illus.

A description is given of the methods of cultivating and processing broom millet [*Sorghum vulgare*] in the Murrabit district of north-west Victoria.—M.A.

450 Karper, R. E. **Registration of sorghum varieties, 6.** *Agron. J.* 1953, **45,** No. 7, 322-3.

Varieties described are: Sart, Combine Kafir-60, Redbine 60, Redbine 66, Hi-Hegari and Popsorghum (Reg. Nos. 96-101, respectively]. Sart is a new syrup-sorghum variety. It is late-maturing, resistant to lodging and to *Colletotrichum graminicolum*, produces high syrup yields and is adapted to Mississippi and the southern States. Combine Kafir-60 is a double-dwarf, combine variety of the Blackhul Kafir type. It is early maturing, but has given higher grain yields than Texas Blackhul and Martin and slightly lower yields than Plainsman in Texas. Redbine 60 is a red-seeded, double-dwarf, combine variety. Redbine 60 is earlier maturing than Martin, but has out-yielded that variety and has equalled the yield of Plainsman in dry-land areas in Texas. Redbine 66 is similar to Redbine 60 in type, but flowers 6 days later than that variety in Texas. Grain yields of Redbine 66 have averaged 12% higher than Martin and have equalled Plainsman and Caprock in Texas. Hi-Hegari is a tall variety for forage and silage use. It has the same adaptation and maturity as Hegari, but is taller. Hi-Hegari has equalled Hegari and standard grain sorghum varieties in grain yield, but has produced 16% higher forage yields than Hegari. Popsorghum is a new, dwarf, Sallu-like variety, suitable for popcorn production. It is adapted to Mexico and to most areas where grain sorghums are adapted.—P.J.B.

451 Franzke, C. J. **Reliance, an early grain sorghum.** *Bull. 426. S. Dak. agric. Exp. Sta.* 1953, pp. 4, illus.

Reliance was produced from a Modoc × Sooner Milo cross. It is adapted to S. Dakota where it stands longer after autumn frost and can be safely sown over a longer period than Norghum. Reliance has an open panicle, similar to Norghum. Over a 4-year period, when sown in early or mid-May, Norghum outyielded Reliance, but in later sowings, the position was reversed.—P.J.B.

452 Leiboff, R. O. Sorgos graníferos. [**Grain sorghum.**] *Bol. Prod. Fom. Agric.* 1952, **4,** No. 37, 15-16. [Esta. Exp. Guatraché, Argentina]

Grain sorghums (*Sorghum vulgare*) are recommended for the semi-arid zones of Argentina, with an annual rainfall of less than 650 mm., bordering on the wheat- and maize-growing regions. As a result of trials, the 3 varieties Double Dwarf Yellow Sooner Milo, Midland Milo and Early Kalo are recommended.—W.J.B.

453 Dillon Weston, W.A.R. **Control of millet smut with formaldehyde.** *Pl. Path.* 1953, **2,** No. 3, 87. [NAAS, Cambridge]

For control of *Sphacelotheca destruens* on common millet (*Panicum miliaceum*), steeping the seed in 40% formaldehyde at a concentration of 1 : 320 of water was more effective than a sprinkling treatment and gave complete control of the pathogen. —P.J.B

454 Lefèvre, P. C. Étude de *Calandra oryzae* L. sur sorgho (*Sorghum vulgare* Brot.). [**A study of the rice weevil** (***Calandra oryzae***) **on sorghum** (***Sorghum vulgare***).] *Bull. agric. Congo belge* 1953, **44,** No. 5, 1001-46, bibl. 58, illus.

This study includes an account of control trials.—E.B.O.

455 Priyavratha Rao, S. B. and Narasimha Rao, D. V. **Bird damage in jowar** [**sorghum**]. *Madras agric. J.* 1953, **40,** No. 10, 466-7. [Agric. Res. Sta. Siruguppa, Madras, India]

The damage caused by birds to 8 different varieties of *Sorghum vulgare*, was assessed in trials in which acreage yields on unprotected plots and on plots where earheads were protected by muslin bags were compared. The birds included sparrows, crows and parrots. The losses in yield varied from 10 to 80% and were greater in early-flowering and late-flowering varieties than in other kinds. Birds tended to select white and yellow grains rather than red grains and bird damage was heavier in: (1) types with loose panicles than in compact types; (2) types with open glumes than in those with the glumes completely encasing the grains. [Further information on the subject of bird-resistant sorghums may be obtained from the Commonwealth Bureau of Pastures and Field Crops.]—W.J.B.

## RICE

456 JORDAN, H. D. **The development of rice research in Sierra Leone.** *Trop. Agric.* 1954, **31,** No. 1, 27-32.

The development of rice growing on the tidal mangrove swamps of Sierra Leone is described and details are given of the cultural practices employed, the varieties of rice used and the pests and diseases encountered. An account is given of the influence on local practices of the experimental work done at the Rokupr Agricultural Experimental Station. The swamps at the river mouths have been cleared of mangroves by local farmers. The areas devoted to rice are flooded by fresh water during the growing season and by salt water during the dry season when the land is fallow. Normally, nurseries are sown on the uplands in June-July and rice seedlings are transferred to the swamps in August-September. The following advice and information on cultural practices is given as a result of experiments: (a) on upland nurseries, seed should be sown at 200 lb. per ac. and transplants should be 8 weeks old, (b) nurseries made at the swamp edge can be sown more densely (at 700 lb. per ac.) than upland nurseries without adverse effects on the survival of the seedlings or the yield of rice. Seedlings in swamp nurseries suffer less from blast (*Piricularia oryzae*) and can be transplanted 2 weeks earlier than those in upland nurseries, (c) the land to be planted should be dug annually to a depth of 8 in. to give optimum yields, (d) there is little response of rice to fertilizers on rich tidal land, but more response on inland swamps and on higher ground. The varieties (obtained from various foreign sources) now recommended for use in Sierra Leone are named. For special conditions a variety of deep-water floating rice, called Indo-China, is used. The problems involved in reclaiming different types of mangrove swamp for rice-growing are discussed.—W.J.B.

457 PIACCO, R. Risi grandinati. [**Rice crops damaged by hail.**] *G. Agric. Domen.* 1954, **64,** No. 4, 29, illus. [Sta. Sper. Risicolt., Vercelli, Italy]

Rice crops in Italy are liable to hail damage from sowing to harvest, i.e., from April to October. Although the rice plant has a great capacity for recovery from hail injury, certain practices can be adopted to reduce this damage to a minimum. Only in the case of early and extremely serious damage should the crop be re-sown (in April-May) or a new crop transplanted (in June). If the crop is damaged later in the season, it is recommended that irrigation should be interrupted for 3-8 days, depending on soil permeability, during June-July, or for a shorter period if the plants are in the boot or the flowering stage. During this suspension of irrigation, fertilizers should be applied. A trial showed that, when a rice crop, damaged by hail, was cut at water-level when 65 cm. high (as sometimes practised during the period 1 June-20 July), the crop recovered rapidly, but the final loss in yield was greater than when the damaged crop was left uncut.—E.B.O.

458 PIACCO, R. Prove di rendimento di alcune razze. [**Yield trials with some rice varieties.**] *Riso* 1953, **2,** No. 10, 5-6. [Sta. Sper. Risicolt., Vercelli, Italy]

In trials carried out in 1952, the rice variety Razza 253 (bred from P.6 × Americano in 1940] yielded 6640 kg. of grain per ha., compared with Balilla, Americano 1600 and R. Bersani which yielded 6500, 6090 and 5920 kg., respectively. Razza 253, already grown in many Italian districts, although similar to Americano 1600 (both varieties are about 118 cm. high), is superior to this variety in the most important characters.—E.B.O.

459 MCCALL, Elizabeth R. and others. **Composition of rice. Influence of variety and environment on physical and chemical composition.** *J. agric. Fd Chem.* 1953, **1,** No. 16, 988-93, bibl. 35. [South. Reg. Res. Lab., New Orleans, La]

The studies reported were made on 8 varieties of rice grown at 3 locations during 1948-50. A summary is given of the physical and chemical composition of each variety. Both environment and variety had highly significant effects on milling yields and the yield of different anatomical fractions of the rice grain, and on the composition of the pericarp and germ fraction. There were significant differences between varieties in respect of the N content of white rice and the ash content of the hulls, while environment significantly affected the ash content of the hulls and the lipid, N, ash and starch content of the endosperm. Data are given of the distribution of P in composite samples of white rice and true rice bran, the inorganic constituents of the ash of the hulls, true bran (pericarp and germ) and white rice, and their micro-element contents.—P.J.B.

460 GRANCINI, P. Diserbo chimico anche per il giavone. [**Chemical weeding also for the *Panicum* spp.**] *Riso* 1953, **2,** No. 10, 16-19, illus.

An account is given of trials in which the chloro-organic preparation Pantox and sodium trichloroacetate [TCA] were successfully applied as sprays for controlling weeds of the genus *Panicum* [*P. crus-galli*, *P. macrocarpa*, *P. phyllopogon* and *P. erectum*], as well as other monocotyledonous species, in the rice-fields of northern Italy. In the method described, which has already been adopted on many farms, the rice-fields are flooded and the water then removed to induce the *Panicum* spp. to germinate. After treatment the soil is kept dry for 1 or 2 days and then flooded again. No toxic residues are left in the soil and rice can be sown soon afterwards. Fifteen kg. of Pantox per ha. are sufficient. Sodium trichloroacetate, which has a slower action, should be applied at the rate of 40-50 kg./ha.—E.B.O.

461 Kasahara, Y. **Some tests on the use of 2,4-dichlorophenoxyacetic acid for controlling weeds in paddy fields (2).** *Ber. Ōhara Inst.* 1951, **9,** No. 4, 454-61, bibl. 4, illus.

The following practical recommendations are made as a result of experiments carried out in 1948-50 on the control of weeds by 2,4-D in irrigated rice fields in Japan : (a) barnyard grass (*Echinochloa crus-galli*) and other graminaceous weeds resistant to 2,4-D should be controlled by hand or mechanical weeding when the field is prepared to receive transplants ; (b) 2,4-D at the rate of 40 g. acid, or 50 g. sodium salt, dissolved in 75-100 l. of water per 10 ares should be sprayed on the weeds (after the field has been drained) 3-5 weeks after the transplanting of the rice (earlier application damages the rice plants) ; (c) the field should be reflooded 1-2 days after treatment with 2,4-D ; (d) the herbicide should not be applied at the time of heavy rains which reduce its effect on the weeds.—W.J.B.

462 Corbetta, G. Concimazione potassica e azotata e malattie parassitarie del riso. [**Potassium and nitrogen manuring and the fungal diseases of rice.**] *Riso* 1954, **3,** No. 2, 20-4, bibl. 9, illus.

463 Padmanabhan, S. Y. **Effect of nitrogenous fertilization on the incidence of 'blast' on rice varieties.** *Curr. Sci.* 1953, **22,** No. 9, 271-2, bibl. 1. [Cent. Rice Res. Inst., Cuttack, India]

The influence of different levels of N fertilization on the incidence of blast (*Piricularia oryzae*) in rice was investigated in tests in which seedlings of 9 different varieties of rice grown in pots, received applications of ammonium sulphate solution equivalent to 20, 40, 60, 80 and 100 lb. N per ac. at the age of 2 weeks ; and were then infected with a spore suspension of *P. oryzae* at the age of 3 weeks. The degree of infection in the leaves of plants, which was recorded 7 days after the initial infection with spores, increased significantly with increasing applications of N on the average of all varieties, but there were significant intervarietal differences in the rate of increase of infection in response to successively heavier applications of N. In pots receiving no N, the degree of infection varied little between varieties. The degree of infection increased least rapidly in response to increasing doses of N in the variety Co.4 and most rapidly in the case of Co.13. Other varieties showed reactions intermediate between those of Co.13 and Co.4—W.J.B.

464 Tirumala Rao, V. and others. **Snail damage to paddy in the Northern Circars and their control.** *Madras agric. J.* 1953, **40,** No. 10, 445-52, bibl. 16.

The nature and extent of snail damage to rice plants in the Northern Circars region of Madras State, India, is described. The snails commonly found in this district are *Viriparus variatus*, *Pila vareus* and *Indoplanorbis exustus*. Snails do most damage to newly transplanted rice in fields which are too low-lying to be properly drained. The stems of the damaged transplants are usually severed by the snails 3-4 in. above their base, below water level. In this way, 10-50% of the transplants may be destroyed. Draining the water from the field at transplanting time, when possible, severely checks the pest. Poison-baiting with metaldehyde is an impracticable method in cases where the water cannot be drained from the field. Partial draining of the fields, followed by an application of 5% BHC dust at 25 lb. per ac., gave excellent protection to the transplants during their most susceptible stage and also killed numerous snails.—W.J.B.

465 Alberda, T. **Growth and root development of lowland rice and its relation to oxygen supply.** *Pl. and Soil* 1953, **5,** No. 1, 1-28, bibl. 33, illus. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

Rice plants growing in the field developed a mat of thin, abundantly branched roots, which grew horizontally in the uppermost soil layer. These roots were morphologically different from normal, deep roots ; they began to develop at the tillering stage and remained fully active until the seed matured. They appeared to be specially adapted to the uptake of $O_2$ and its transport to the rest of the root system. In pot trials, the $O_2$ content of the roots of old plants was very low and the transport of $O_2$ through the plant to the roots was much reduced, compared with young plants. This was the case only where the plants were grown in reduced culture media. It did not appear to be certain that stem elongation retarded $O_2$ transport to the roots; the factors causing low $O_2$ transport were ascribed to unknown developmental factors. In pot trials, covering the irrigation water with oil so that it became very poor in $O_2$ resulted in poor development of the root mat and degeneration of the rest of the roots, without injuring the upper parts of the plants. This was not due to the exclusion of light by the oil. Where the water under the oil was rich in $O_2$, the root mat was well developed, but these roots were not able to supply $O_2$ to the remainder of the root system. Covering the water with oil so as to deplete soil and irrigation water of $O_2$ did not prevent transport of $O_2$ from the upper parts of the plant, since active salt uptake by the roots continued. It was concluded that the development of a root mat at the soil-surface facilitates $O_2$ transport to the rest of the root system, but does not necessarily imply that other modes of $O_2$ transport to the roots are thereby excluded.—P.J.B.

466 MISRA, G. **Photoperiodic behaviour of medium-early varieties of rice.** *Science* **118,** No. 3071, 552-3, bibl. 8. [Bot. Dep., Ravenshaw Coll., Cuttack, India]

Three medium-early rice varieties were subjected to short-day photoperiods of 10 hr. for periods of 3, 4, 5, and 6 weeks after the seedlings were 7 days old. Observations of the time at which ear emergence of the main shoot took place showed that the longer the time during which the plants were subjected to short-day photoperiods, the greater the delay in ear emergence. The delay was very marked where short-day treatments were continued up to the time of heading. Response to short days by medium-early varieties differed considerably from that of late, or winter varieties, in which short-day treatments caused an increase in earliness of maturity. With medium-early varieties, 24 hr. photoperiodic treatment for 3-6 weeks also delayed maturity.—P.J.B.

467 DION, H. G. **Report of the second meeting of the International Rice Commission's Working Party on Fertilizers. 1952.** *Devel. Pap. 37. FAO* 1953, pp. 46.

Among the contents are : a summary of discussions on rice fertilizer problems, experimentation and practice, the productivity of paddy soils in rice-producing countries and soil-fertility problems in China. In studies of green manure crops in India, dhaincha (*Sesbania aculeata* and *S. speciosa*), sunn-hemp (*Crotalaria juncea*) and cowpea (*Vigna catjang*) gave the best results in terms of rice yields. For equivalent amounts of N, green manures gave yields greater than ammonium sulphate at a number of locations in India. Trials in Ceylon on the use of plant nutrients for treating rice seed gave inconclusive results. In Viet Nam, treating rice seed with $MgSO_4$ increased yields, though this effect varied between varieties and from year to year. This effect was considered to be mainly due to increased seedling vigour following the soaking of seed before sowing.—P.J.B.

468 UNITED STATES Department of Agriculture. **Recent research on drying and storage of rough rice [paddy].** *Bull. 29. South. Co-op. Ser.* 1953, pp. 29, bibl. 18, illus.

## GENERAL

469 ELLIOT, C. S. and others. **Spring sowing of winter cereals.** *Agriculture, Lond.* 1953, **60,** No. 8, 378-83, illus. [Nat. Inst. Agric. Bot., Cambridge]

As a result of time-of-sowing trials carried out in various parts of Britain, a list is presented of the more widely-grown varieties of wheat in England placed in order of increasing suitability for late spring sowing and classified into 4 groups according to the latest date at which the varieties can be sown without risk of failure. All varieties of winter oats can be sown in spring. The winter barley Pioneer cannot be sown after mid-February without risk of failure ; Prefect may be sown a little later.—W.J.B.

470 MONTINGA, E. H. De kwaliteit van stro als grondstof voor de industrie. [**The quality of straw as a raw material for industry.**] *Landbouwk. Tijdschr., Wageningen* 1953, **65,** No. 11, 671-5.

The suitability of various types of cereal straw for industrial processing, chiefly in the cardboard and paper-making industries, is discussed. Rye and wheat straw are more valuable than oat and barley straw. Straw for manufacturing purposes should be ripe, long, thick-stemmed, free of weeds, chaff and other impurities and have a moisture content lower than 20%.—W.J.B.

471 VIK, K. Åtte års forsøk med representanter for de fire vårkornarter som dekkvekst, sådd med ulike såmengder og gjødslet med stigende mengder salpeter. [**Experiments with different nurse crops sown with different rates of seeding and given different applications of nitrate of lime.**] *Forskn. Fors. Landbr.* 1953, **4,** No. 1, 1-54, bibl. 10, English summary pp. 51-4. [Agric. Coll. Norway, Aas]

The trials reported were carried out during 1941-8, using as nurse crops for grass/clover mixtures the following oat varieties : Gullregn II, Ørn and Jøtul; the wheat varieties Fram II and No. 0617-26; Petkus spring rye; Maja 2-row barley and Asplund 6-row barley. Soils used were marine glacial clays, with 7-9% organic matter, a pH of 5·9-6·5, a fairly high P content and moderate K content. In the trials, the nurse crops were given a basal application of 300 kg. superphosphate and 150 kg. 33% K salt per ha. Sowing rates were approximately 110, 140 and 170 kg. per ha. for 6-row barley, oats and spring rye, and 130, 160 and 190 kg. per ha. for 2-row barley and wheat. Grain yields were significantly increased by an average of 210 kg. per ha. by the first sowing-rate increase of 30 kg. per ha ; for the second increment, the grain-yield increase was significant in the case of barley only. Manurial treatments, apart from the basal dressings, were nil, 150 and 300 kg. $CaNO_3$ per ha. In years with a low incidence of lodging, the interaction between N treatment and sowing rates was positive, with increasing yields as sowing rates and N treatments increased ; in years with a high incidence of lodging, the interaction was negative. Wheat gave the maximum response to N treatment where the sowing rate was 160 kg. per ha. ; with oats, maximum response to N occurred where the sowing rate was 110 kg. per ha. Straw yield responses corresponded closely to grain yield responses. Maturity of the cereal crops was delayed up to 2-3 days following treatment with the maximum amounts of N. Asplund 6-row barley gave the greatest yield response of 590 kg. per ha. following the first 150 kg. per ha. N manure increment, then oats and Maja 2-row barley. Greatest response to the second 150 kg. N manure increment was given by Maja (400 kg. per ha.), followed by Asplund. Yield response to the full 300 kg. N manure increment was greatest for Asplund and Maja barley, followed by oats, wheat, and, a long way behind, by spring rye. The protein content of the grain of all varieties rose by an average of 0·6% for the first 150 kg. per ha. N manure increment, and by an average of 1·5% following the 300 kg. per ha. N manure increment. Of the applied N at both rates of application, 50-60%, was taken up by the cereals ; in the case of spring rye, utilization of applied N was relatively low. Greatest hay yields of undersown herbage species (grass/clover) were obtained where Asplund 6-row barley was used as the nurse crop, followed by spring rye, 2-row barley, wheat, and, some way behind, by oats. Over 90% of the differences in hay yields were due to variation in the total yields of the nurse crops. An increase of 100 kg. per ha. in total yields of the cereal crops reduced hay yields by an average of 73 kg. per ha. during the first year of ley harvest. Applications of 150 and 300 kg. N manure per ha. reduced first-year hay yields by an average of 630 and 1290 kg. per ha., respectively. In terms of grain yields as balanced against hay yields during the first two ley-harvest years, applications of 150 kg. N manure per ha. left a certain margin of profit, while applications of 300 kg. N manure caused a loss. Barley appeared to be the most economic nurse crop when used with N manures. Most of the hay yield decline was caused by loss of clover stands. First-year hay yields were reduced by 390 kg. per ha. where cereal sowing rates were increased by 30 kg. per ha. This effect was not apparent in the second harvest year.—P.J.B.

472 Paleev, A. M. [**Lodging in grain crops.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **92,** No. 2, 435-8, bibl. 14, illus.

It has been estimated that loss of grain in the USSR through lodging in some years amounts to 25-30% of the total yields. Reviewing the studies in which the three types of lodging have been discussed (that due to weak anchoring by the roots; to stems which are weak at the base ; and to the fracture of the upper part of the stem), the author records that the work of Oparin and his school has shown that climate, surplus soil moisture, root nutrients, and other internal and external factors may affect enzyme activity (and thereby the biochemical processes of the lignification or disintegration by hydrolysis of the cell walls). The author's prolonged tests (with many replications) have shown that lodging can occur as a result of fracture in the upper part of the stem (usually at the phase of milk-ripeness) through disintegration of the stems' cell walls. A knowledge of the process of such dissociation would help to solve the problem of lodging and accelerate the work of breeding grain crops which are resistant to lodging. —M.H.

473 Forsberg, D. E. **The response of various forage crops to saline soils.** *Canad. J. agric. Sci.* 1953, **33,** No. 6, 542-9, bibl. 10, illus. [Domn. Forage Crops Lab., Saskatoon, Sask.]

Field and greenhouse trials were carried out to determine the tolerance to alkaline soils of a number of grass, cereal and legume species. In field trials on alkaline soils, cereal crops germinated well, but gave very low yields. Tolerance to alkalinity appeared to be greatest in oats, followed in order by barley, linseed, rye, wheat and rape. Oats grown for forage appeared to have similar tolerance to the relatively tolerant grass species and gave yields of 0·49 tons hay per ac. when grown in soils with conductivity readings of 4·25 mmhos/cm. (0·216% salts in the top 6 in. soil layer). In greenhouse trials, cereal crops, except for Hannchen barley, were killed by soil alkalinity after 18 weeks' growth ; they appeared to become very susceptible to alkalinity in the late seedling stages.—P.J.B.

474 Ciferri, R. La disinfestazione dei cereali immagazzinati. [**The disinfestation of stored cereals.**] *Ital. agric.* 1954, **91,** No. 1, 59-65.

The appropriate dose of Lindane for disinfesting cereal grain is 2·5 ppm., i.e. 0·25 g. per 100 kg. of grain; but half this amount is sufficient if the grain is to be stored for a short time only.—E.B.O.

475 LOPEZ CRISTÓBAL, U. Preservación de granos almacenados. Nueva técnica con los plaguicidas sintéticos. [**Preservation of stored grain. A new technique with chemical pesticides.**] *Rev. Fac. Agron. Ciudad Eva Perón* 1953, **29,** No. 1a, 85-106, bibl. 169, illus.

Cereals stored on the farm can be preserved from insect attack by the use of thin paper discs, 1 cm. in diameter, which are impregnated with a 2% solution of Lindane in deodorized gas-oil, and, after drying, are mixed with the grain at rates of 300 g. per 100 kg. of small-grained cereals or 400 g. per 100 kg. of maize grain. The processes involved in the deodorization of the gas-oil and the impregnation of the papers are described. The papers, which destroy adult insects on contact, remain active for about 3 months, after which they can be recovered by sifting, and after reimpregnation, used again. The method is not applicable in cases where grain contains quantities of dust which coat the papers and impair their destructive action. Impregnated papers do not, as far as can be determined, contaminate the grain. A valuable bibliography on the preservation of stored grain from pests is appended.—W.J.B.

## LEGUMES

### SOYABEAN

476 MULLER, H. M. **Soybean production.** *Fmg in S. Afr.* 1953, **28,** No. 238, 245-8, bibl. 2, illus.

A description of the soyabean plant, its climatic requirements, sowing, cultivation and harvesting are given. Seed yields vary from 42 bags per morgen [2·1165 ac.] on irrigated land to 8-25 bags per morgen on dry land [wt. per bag not given]. For green silage material it is estimated that, depending on variety and spacing, one ton of this can be obtained for every 300 lb. seed expected, or, 5-13 tons of hay per morgen.—M.A.

477 DIMMOCK, F. and WARREN, F. S. **The influence of time of planting on the yield and composition of soybean seed.** *Canad. J. agric. Sci.* 1953, **33,** No. 6, 550-8, bibl. 8, illus. [Cent. Exp. Fm, Ottawa]

Capital and Mandarin soyabeans were sown at Ottawa on 19 and 26 May and on 2, 9 and 16 June. Both varieties were harvested in mid-October. At this time, the plants sown at the first 3 dates appeared to be mature, while those sown at the last 2 dates were not fully mature. Yields of Capital sown at the above 5 dates during 1950-2 averaged 41·5, 37·8, 34·5, 28·8 and 21·6 bu. per ac., with average 1000-grain weights (1951-2) of 140, 135, 138, 130 and 129 g., respectively. Yields of Mandarin averaged 38·4, 34·5, 32·3, 27·1 and 16·2 bu. per ac., with 1000-grain weights (1951-2) of 207, 202, 202, 196 and 184 g., respectively. Yield reduction due to delayed sowing was due more to reduction in seed numbers than to reduced 1000-grain weights. Delaying sowing reduced the oil content and increased both the iodine number of the oil and the protein content of the seed.—P.J.B.

478 PENDLETON, J. W. and SLIFE, F. W. **Hill planting versus drilling of soybeans.** *Agron. J.* 1953, **45,** No. 9, 451-2. [Illinois Agric. Exp. Sta., Urbana]

Trials showed that soyabeans sown in hills, with 5-15 seeds per hill and 10-40 in. between hills in the row, in all cases resulted in lower yields and a higher incidence of weed infestation than where the soyabeans were drilled at a rate of 10 seeds per ft.—P.J.B.

479 WEISS, M. G. **Registration of soybean varieties, 3.** *Agron. J.* 1953, **45,** No. 7, 326-30, bibl. 21, illus.

Varieties described are: Lincoln, Hawkeye, Adams, Monroe, Blackhawk, Wabash and Roanoke (Reg. Nos. 5-11, respectively). Lincoln is adapted to east-central Nebraska, central and southern Iowa, northern Missouri and central Illinois, Indiana and Ohio. In regional trials during 1944-51, grain yields of Lincoln, Illini and Dunfield averaged 31·1, 28·0 and 27·1 bu. per ac. and lodging scores (1=erect, 5=prostrate) were 2·2, 2·9 and 2·9 respectively. Hawkeye is widely adapted in the north-central States of the U.S. In regional trials during 1945-51, respective yields of Hawkeye and Richland were 32·3 and 28·4 and lodging scores 1·5 and 1·6. Adams is adapted to a belt running from east-central Nebraska through central Iowa to north-central Illinois. It matures about 1, 2 and 3 days earlier than Dunfield, Lincoln and Illini, respectively, and 4 days later than Hawkeye. In regional trials during 1947-51, respective yields of Adams, Lincoln and Hawkeye were 32·4, 32·3 and 31·8 bu. per ac. and lodging scores 2, 2·1 and 1·5, respectively. Monroe is adapted to Minnesota, Ohio and Wisconsin. In regional trials during 1943-51, Monroe, Earlyana and Mandarin (Ottawa) gave average yields of 27, 27·5 and 26·2 bu. per ac., had lodging scores of 2·1, 2·8 and 1·4 and bean quality scores (1=excellent, 5=very poor) of 1·6, 2 and 1·8, respectively. Blackhawk in regional trials during 1945-51 gave average yields of 28·8, compared with 26·9 and 27·2 bu. per ac. for Habaro and Earlyana, respectively. It is adapted to a wide range of north-central States. Wabash is adapted to a region extending from north-eastern Kansas through central Missouri to northern Kentucky.

In regional trials during 1943-51, Wabash, Chief and Patoka yielded an average of 30·3, 29·6 and 28·5 bu. per ac., had lodging scores of 2·1, 2·7 and 2·3 and bean quality ratings of 1·6, 2 and 1·9, respectively. Roanoke is adapted to the southeastern States of the U.S., except Florida, and has slightly outyielded Volstate in regional trials.—P.J.B.

480 SOYBEAN DIGEST. **Leading soybean varieties.** *Soybean Dig.* 1954, **14,** No. 4, 8-9 and 34.
Notes are given on the characteristics of the principle northern and southern soyabean varieties in the USA, together with a map showing the regions to which each variety is adapted.—P.J.B.

481 FISHER, J. E. and LOOMIS, W. E. **Auxin-florigen balance in flowering of soybean.** *Science* 1954, **119,** No. 3080, 71-3, bibl. 12. [Iowa State Coll., Ames]
Experiments are reported on the effect of nicotine sulphate, auxin and triiodobenzoic acid on the flowering of Lincoln soyabeans grown under different photoperiods. Evidence was found that flowering was controlled by hormones, but it was not possible to differentiate between auxin-florigen balance and the existence of balanced levels of auxin, alone, as the controlling agent.—P.J.B.

## GROUNDNUT

482 MARCHAND, R. and CATHERINET, M. Incidences du fauchage préalable des fanes sur la récolte de l'arachide. [**Effect on groundnuts of haulm-cutting before harvest.**] *Bull. agron. 8. Fr. d'out. mer* 1953, 55-65, bibl. 1, illus. [Cent. Rech. Agron., Bambey, Senegal]
Trials, in which one group of groundnut plants was cut 15 days, and another 8 days, before harvest, showed that haulm cutting caused a significant decrease in pod yield compared with the uncut control (the decrease being greater with the earlier cutting) but that it influenced favourably the germination capacity of the seeds. Threshing groundnuts immediately after harvest shortened the period of seed dormancy and also increased the germination percentage.—E.B.O.

483 YORK, J. O. and WISER, W. J. **Peanut performance tests, 1944-52.** *Rep. Ser. 39. Ark. agric. Exp. Sta.* 1953, pp. 15.
In trials at the Main Experiment Station, highest yields of shelled groundnuts were given by Spanish Selection 103, H-186 (an African variety), Improved White Spanish and Spanish Selection 102, with 1187, 1169, 1151 and 1142 lb. per ac., respectively. Average yields of groundnut hay over 3 years were headed by H-153 (African) with 2·66 tons of hay per ac., followed by Virginia Runner with 2·55 tons per ac. and Virginia Jumbo with 2·45 tons per ac. At the Fruit and Truck Branch Experiment Station, the highest yields of shelled nuts were produced by Improved White Spanish and H-183 (African).—P.J.B.

484 DUFOURNET, R. Essais comparatifs variétaux sur arachides à la Station de l'Alaotra (Madagascar) 1952. [**Comparative varietal trials with groundnuts at the Alaotra Station (Madagascar) in 1952.**] *Oléagineux* 1953, **8,** No. 10, 671-6, illus.
In comparative trials with 20 groundnut varieties, Valencia No. 247, Buitenzorg No. 214 and Hybrid No. 33 gave the highest yields. Valencia No. 247, grown for food, gave the highest economic returns. —E.B.O.

485 BOUFFIL, F. and TOURTE, R. L'influence du trempage préalable des graines d'arachide sur la levée et le rendement. [**The influence of pre-soaking groundnut seeds on emergence and yield.**] *Bull. agron. 8. Fr. d'out. mer* 1953, 49-54, bibl. 1, illus. [Cent. Rech. Agron., Bambey, Senegal]
The results from trials, in which pre-soaked groundnut seeds were sown in replicated plots, indicated that soaking either did not affect emergence and yield or that it affected them unfavourably. It therefore appears that this practice is not justified. [See also *Fld Crop Abstr.* 3 : 920.]—E.B.O.

486 GIBSON, I. A. S. and CLINTON, P. K. S. **Pre-emergence seed-bed losses in groundnuts at Urambo, Tanganyika Territory.** *Emp. J. exp. Agric.* 1953, **21,** No. 83, 226-35, bibl. 14.
Pre-emergence seed-bed losses in groundnut cultivations between 1949 and 1951 in the Urambo region of the Overseas Food Corporation project led to a series of experiments, using the groundnut variety Natal Common, designed to determine the factors involved. Results showed that seed injury during decortication was the most important factor contributing to pre-emergence seed-bed losses. Provided that an adequate control of seed-injury can be developed, the range of efficient fungicides already known, particularly the organo-mercurial preparations, give promise of an almost complete control of seed-bed losses of the type studied.—M.A.

487 JAUBERT, P. Recherches de la dose d'emploi optimum de quatre fongicides utilisés pour traiter les semences d'arachide. [**Investigations into the optimum rate of application of four fungicides used for treating groundnut seeds.**] *Bull. agron. 8. Fr. d'out. mer* 1953, 162-74, illus. [Cent. Rech. Agron., Bambey, Senegal]

Of the 4 fungicidal dusts tested, Arasan, SF 1518 and Verisan were found to be suitable for disinfecting groundnut seeds, the optimum rate of application being 2-6 parts of dust per thousand parts of seed by weight.—E.B.O.

488 BERNAUX, P. Essais de produits antiparasitaires pour la désinfection des semences d'arachide dans le sud de la France. [**Fungicidal trials for disinfecting groundnut seeds in the south of France.**] *Oléagineux* 1953, **8**, No. 12, 855-7, bibl. 4, illus. [Éc. Nat. Agric. Montpellier, France]

Trials, in which seeds of the groundnut variety White Spanish were treated for control of *Fusarium* sp., indicated that a preparation containing 50% TMTD was effective. The germination percentages of 2 lots of seeds treated with this preparation were 56 and 73, respectively.—E.B.O.

489 JAUBERT, P. Deuxième étude sur la symbiose bactérienne des Légumineuses au Sénégal (Casamance comprise). [**Second study on the bacterial symbiosis of the Leguminosae in Senegal (Casamance included).**] *Bull. agron. 8. Fr. d'out. mer* 1953, 77-97, bibl. 10, illus. [Cent. Rech. Agron., Bambey, Senegal]

These investigations, conducted in various localities in Senegal in 1952, included : a study of the factors, such as rainfall and variety, influencing the development of nodules on groundnut roots ; trials on groundnut seed inoculation ; and observations on the nodules of legumes other than groundnuts, consisting of cover crops and wild species. The main conclusion from these field trials was that the practice of inoculating groundnut seed with a specific strain of *Bacterium radicicola* was not justified. [See also *Fld Crop Abstr.* 6 : 983.]—E.B.O.

490 THÈVENIN, L. Contribution à l'étude anatomique du fruit d'*Arachis hypogaea* entre la fécondation et la maturité. [**A contribution to the anatomical study of the fruit of *Arachis hypogaea* from fertilization to maturity.**] *Bull. agron. 8. Fr. d'out. mer* 1953, 66-76, bibl. 8, illus. [Cent. Rech. Agron., Bambey, Senegal]

491 TOURTE, R. Les engrais N.P.K. Poursuite de l'étude de leurs effets sur arachide et mil au Sénégal. [**Continuation of the study on the effect of NPK fertilizers on groundnuts and millet (*Pennisetum* sp.) in Senegal.**] *Bull. agron. 8. Fr. d'out. mer* 1953, 5-24, illus. [Cent. Rech. Agron., Bambey, Senegal]

492 MYERS, J. M. and ROGERS, F. **Determination of optimum air delivery, air temperature and depth of seed for mechanical drying.** *Rep. Florida agric. Exp. Sta. 1952* 50-2. [Received 1954]

Groundnuts with a moisture content of 40% could be dried at temperatures of up to 115°F. without loss of quality. At temperatures above 115°F. skin slippage increased, though germination percentages were not significantly reduced until drying temperatures exceeded 140°F. Groundnuts dried to less than 7% moisture content had 4-10% more skin slippage than those dried to 7-9% moisture content. Optimum drying conditions were obtained with an air-flow of 40 cu. ft. per min. per sq. ft. of floor area, a seed depth of 4 ft., and where the groundnuts were dried to a moisture content of 7-9%.—P.J.B.

493 REYNOLDS, H. E. and others. **Palatability and chemical studies on peanuts grown in rotation with cotton dusted with insecticides containing benzene hexachloride.**] *J. agric. Fd Chem.* 1953, **1**, No. 12, 772-6, bibl. 3. [Human Nutr. Bur., U.S. Dep. Agric.]

## PEA

494 DEVCIC, J. and POPOVICH, M. Densidad de siembra conveniente para la arveja variedad " Alaska," destinada al envasado. [**Density of sowing trials with peas of the variety Alaska, grown for canning.**] *Idia* 1953, No. 67, 2-12, bibl. 7, illus. [Inst. Fitotec. Castelar, Argentina]

Trials were carried out in 1949-51 to determine the influence on yields of spacing distances of 15, 20 and 30 cm. between rows and 4, 6 and 8 cm. between plants. There was a close positive correlation between density of planting and yield. In all years, the spacing 15 × 4 cm. gave significantly higher yields than any other. Close spacing was associated with absence of weeds and with small seed size.—W.J.B.

495 STRAND, E. Sortforsøk med erter på Vollebekk Forsøksgård 1945-1952. [**Variety trials with field peas at Vollebekk Experimental Farm (Norway) 1945-1952.**] *Forskn. Fors. Landbr.* 1953, **4**, No. 3, 279-92, bibl. 15, English summary p. 291.

The trials reported were carried out with 5 yellow, 2 green and 8 grey pea (*Pisum sativum* var. *pacylobum*) varieties and one variety of fodder vetch [*Vicia sativa*]. Details are given of the origin and mutual relationships between the varieties used. Mean seed yields of the yellow pea varieties were 189, 184, 153, 145 and 143 kg. per decare (0·1 ha.) for Kloster, Torsdag III, Ambrosia II, Torsdag II and Onsrud, respectively. Mean yields of Mansholt and Ringeriks green pea were 279 and 258 kg. per decare, respectively. For the grey pea varieties W.541, Parvus, Brio, Hero, Norsk gråert, Malmert, Vesta and Atomert and fodder vetch, seed yields averaged 204, 195, 174, 167, 138, 130, 113, 110 and 165 kg. per decare, respectively. Straw yields were highest for Atomert, with 327 kg. per decare, followed by fodder vetch, 308 kg., Onsrud, 306 kg. and Ambrosia II, 287 kg. per decare. Mean seed yields were relatively low owing to 3 very unfavourable trial years. Brief notes are given on the varieties used, together with data of their heat-sum requirements, as compared with oat and barley varieties. Grey pea varieties tolerated high rainfall better than did green or yellow varieties. Varieties with little straw also tolerated high rainfall better than those with much straw.—P.J.B.

496 KNOBLAUCH, F. Sortsforsog med lave marveaerter 1950-52. [**Varietal trials with short marrow-fat peas 1950-52.**] *Tidsskr. Planteavl* 1953, **56,** No. 4, 613-32.

The trials were carried out at 4 locations in Denmark and included 15 varieties. Sowing rates were adjusted to give, as nearly as possible, 20 plants per metre of row. Days from sowing to flowering ranged from 37 for Kelwo to 53 for Balder. W.'s S1953. Days from sowing to maturity, where once-over picking was practised, ranged from 88 for Kelwo, to 107 for Balder W.'s S1953 and 1541 (Swedish). Where 4 consecutive harvests were taken, these were made over periods ranging from 12 to 20 days. Yields in terms of green pods were headed by Safir Toftø S1953 (2-years' trials, only), with 197 hkg. per ha., followed by Rex, Imperial Toftø S1953, Lincoln and Beta S1953, with 182, 176, 175 and 174 hkg. per ha., respectively. Lowest yields were given by Kelwo, with 133-143 hkg. per ha. These data refer to 4-times-over picking. Yields where once-over picking was practised were 182, 180, 174, 174, 173 and 170 for Safir Toftø S1953, Imperial Toftø S1953, Rex, Balder W'.s S1953, Continental Ny Munkegaard S1953 and Delikatesse (dark-seeded), respectively. These data are means for all years and all 4 locations. Mean seed yields at 2 locations where once-over picking was used were 86, 81, 80, 80 and 80 hkg. green peas per ha., for Balder W.'s 1953, Skandia, Imperial Toftø S1953, Continental Ny Munkegaard S1953 and 1541, respectively, while yields where 4-times-over picking was practised averaged 83, 75, 76, 73 and 76 hkg. per ha., respectively. Mean seed percentages in the pod at 2 locations were 47·5, 46·8, 46·7 and 43·1 for Skandia, Balder W.'s S1953, 1541 and Continental Ny Munkegaard S1953. Data are also given of seed-size groupings. Notes are given on each variety.—P.J.B.

497† WAINSTEIN, P. Estudio comparativo sobre variedades de arveja. [**Varietal trials with peas in Argentina.**] *Idia* 1953, No. 63, 16-24, bibl. 8, illus.

498 RIEPMA KZN, P. De invloed van IPC (isopropyl-n-phenylcarbamaat) op erwten. [**The influence of IPC on peas.**] *LandbVoorl.* 1953, **10,** No. 12, 467-9, bibl. 2. [Cent. Inst. Landbouwk. Onderz., Wageningen]

The influence on the yield of peas of the herbicide IPC, applied at various dates at rates of 2·5, 5, 6·25 and 7·5 kg. active material per ha., was determined in experiments in 1952-3. At rates of 5 kg. per ha. and more, IPC caused a progressive reduction in pea yields with increasing rates of application. There was little difference between the yields of untreated plots and those treated with IPC at 2·5 kg. per ha.—W.J.B.

499 FEEKES, F. H. Selectieve onkruidbestrijding met isopropyl-N-phenyl-carbamaat (IPC) en natrium-isopropyl-xanthaat (NIX). [**Selective weed control with isopropyl-N-phenyl carbamate (IPC) and sodium isopropyl xanthate (NIX).**] *Meded. LandbHogesch., Gent* 1953, **18,** No. 2, 455-76, bibl. 9, English summary p. 47.

Notes are given on the characteristics and uses of IPC and NIX. Tentative recommendations, based on the results of trials in the Netherlands, are given for the use of these herbicides for weed control in peas. For controlling wild oats and volunteer grain in peas, IPC should not be applied before the weeds have reached a height of 2-3 cm. Treatments with 10-20 kg. IPC per ha. (as Triherbide IPC, a commercial product) have given outstanding control of these weeds in peas.—P.J.B.

500† BLANCHARD, M. Contribution à l'étude de la biologie de l'orobanche et à sa destruction. [**A contribution to the study of the biology of broomrape and to its control.**] *Ann. Inst. agric. Algér.* 1952, **6,** No. 9, pp. 49, bibl. 20, illus. [Sta. Cent., Maison-Carrée, Algeria]

General information is given on broomrape, *Orobanche speciosa,* including a list of host plants, a description of its seed, seed germination, growth of the seedling and its fixation on the host plant (pea, vetch and bean in these trials), its further growth and effect on the host plants, mainly pea. An account is given of laboratory and field trials in controlling broomrape on peas [see *Fld Crop Abstr.* 5 : 1161]. Results from these field trials were confirmed by the results from similar field trials with lentils under the same conditions. Soprasan appears to destroy the germination capacity of broomrape seeds.—E.B.O.

501 MORRIS, G. P. **Investigations into the use of the first two leaves of pea seedlings in varietal identification.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 489-93, bibl. 1, illus.

Following the method described by Mr. Van der Vaart [see *Fld Crop Abstr.* 5 : 1162] for identifying pea varieties in the seedling stage, 40 samples of peas were sown in plots in a greenhouse and the leaf scales produced at the two lowest nodes, at the third and fourth leaf stage of plant growth, were removed, mounted and photographed. It was concluded that an examination of such leaf scales could often assist in varietal identification. This is true not only of the Dutch varieties but also of other varieties of *Pisum sativum* used for canning and packeting and of *P. arvense* grown as a farm crop. The article is illustrated by 2 plates showing the seeds of 39 pea varieties and 14 plates of actual-size photographs showing the first and second node scales of average plants from 35 pea varieties.—C.L.S.

502 HILLMAN, H. D. Bestimmung von Erbsensorten im Keimlingsstadium. [**Determination of pea varieties in the seedling stage.**] *Saatgutwirtschaft* 1954, **6,** No. 1, 13, bibl. 1. [Klostergut Weende, Germany]

A study of the shape, outline, relative size and height of the central and lateral leaflets of the two lowest leaves helps to differentiate between varieties having seed of similar coat texture, colour, shape and 1000-seed weight.—D.B.

503† ZEIJLEMAKER, F. C. J. **The metabolism of nicotinic acid in the green pea and its connection with trigonelline.** *Acta Bot. Neer.* 1953, **2,** No. 2, 123-43, bibl. 52, illus. [Pl. Physiol. Lab., Amsterdam, Netherlands]

The course of the synthesis of nicotinic acid during the development of the green pea was traced. Nicotinic acid formation was inhibited by placing plants in the dark or by depriving them of nitrogenous nutrients. Cut pea plants placed in nutrient solutions were able to synthesize nicotinic acid at a normal rate. In an experiment in which nicotinic acid was fed to the cut stems of plants, the nicotinic acid content of the leaves remained constant once a certain level was reached and quantities of the acid were converted into trigonelline.—W.J.B.

## BEAN

504 SOPER, M. H. R. **The influence of farm practice on the productivity of field beans.** *Emp. J. exp. Agric.* 1953, **21,** No. 81, 22-32, bibl. 4. [Dep. Agric., Oxford Univ.]

A survey of farmers' crops of winter field beans was carried out near Oxford in the years 1947-9 to determine the factors responsible for the present unsatisfactory yields of this crop in England. The number of pods per acre recorded was regarded as an accurate indication of the yield of threshed beans. The number of plants per ac. established, but not the number of pods yielded per ac., was significantly higher on heavy clays than on light soils. On 38% of the acreage surveyed no fertilizer or farmyard manure was applied to the crops and yields were significantly lower on unmanured than on manured fields. Sowing-dates varied from 28 Sept. to 15 Nov., the highest yields being obtained from seed sown before 16 Oct. Factors which tended to cause unsatisfactory establishment, and hence low yields of beans, were severe winter killing by low temperatures, unsatisfactory seed, and damage by birds. Shallow sowing appeared to be responsible for some of the damage caused by frost and by birds. The incidence of chocolate spot (*Botrytis cinerea*) was rarely high and, in general, damage from this disease appeared to be associated with a low manurial status. Black fly (*Aphis fabae*) was not a serious pest of winter beans in the area surveyed. For a good crop, it is recommended that 3-4 bu. of clean, healthy seed be sown per ac. during the first half of October on fertile land in which the phosphate and potash status is high.—W.J.B.

505 SNEDDON, J. L. **Long-tailed field mice. Damage to field beans.** *Scot. Agric.* 1953, **33,** No. 2, 77-8, bibl. 1., illus. [W. Scot. Agric. Coll., Auchincruive, Ayr.]

A note is given on damage to winter beans in Scotland by *Apodemus sylvaticus*, with particulars of control measures.—P.J.B.

## OTHER

506† GILES, J. E. and others. ***Lathyrus ochrus* (L.) D.C. as a green manure under irrigation in the Murray Valley area.** *J. Aust. Inst. agric. Sci.* 1953, **19,** No. 3, 183-91, bibl. 8, illus.

*Lathyrus ochrus*, an annual legume introduced from Israel, was shown to be a valuable irrigated species for green manure on a wide range of soils in the Murray Valley area. It outyielded other commonly grown green-manure species on all the lighter soil types over two seasons (1950 and 1951) and equalled tick beans (*Vicia faba* var. *minor*) on some of the heavier soils. *L. ochrus* is of particular value because of its relatively rapid growth-rate, earliness of maturity and high yield of N at the time of turning under. On a Barmera sand, April sowing with controlled spacing, 7 in. by 4 in. (a seed rate of 60 lb. per acre) gave satisfactory yields of herbage and seed.—From authors' summary.

507 NOHE, E. Versuche zum Sommerwicken-Samenbau. [**Summer-vetch seed-production trials.**] *Saatgutwirtschaft* 1953, **5,** No. 10, 250-2. [Saatzuchtwirtschaft, Dr. h.c. Hans Hege, Hohebuch-Waldenburg]

From 1950 to 1952, experiments were carried out to determine the most economical conditions for producing seed of summer vetch. Vetches were sown in admixture with oats, field beans, mustard and summer rape, respectively, and the yields of seed, straw and seed impurities measured. Summer vetches, both in admixture with late-maturing oats and also with field beans, yielded well but, when sown with oats, the vetch seed tended to be small and showed a lower germinability than when sown in other mixtures. Vetch-bean straw contained 4 times, and vetch-oat straw 3 times, as much digestible protein as oat straw alone.—M.A.

508 SATTAR, A. **Effect of soil temperature and moisture on the incidence of gram wilt.** *Pakist. J. Sci.* **5,** No. 1, 16-21, bibl. 4, illus. [Punjab Agric. Coll. and Res. Inst., Lyallpur]

Pot and field experiments were carried out to determine the effect of soil temperature, soil moisture and date of sowing on the incidence of wilt (caused by *Fusarium orthoceros*) in Bengal gram or chickpea (*Cicer arietinum*). In pot experiments in which chickpea plants were grown in infected soil, the attack of wilt was increasingly rapid with increasing soil temperatures over the range 77-95°F. Chickpea plants grown in pots of soil of varying moisture content at a fixed temperature of 86°F. succumbed more rapidly to wilt at soil moisture contents of 9·0, 12·8 and 24·1% than at 16·7 and 18·4%. Thus, both a deficiency and an excess of soil moisture favoured the development of wilt. In field experiments in which sowings were made in infested fields at various dates from early September to mid-December, crops sown in early October (soon after soil temperatures fell below 90°F.) were the least infected by wilt. There are two phases of wilt attack, the first in October-December, the second in February-March. Crops sown too late (after mid-October) tended to resist the first phase but to succumb to the second. In further field experiments it was found that irrigation once or twice between November and February reduced wilt infection.—W.J.B.

509† RIVALS, P. Le dolique d'Egypte ou lablab (*Dolichos lablab* L.). [**Egyptian kidney-bean or lablab (*Dolichos lablab* L.).**] *Rev. int. Bot. appl.* 1953, **33,** No. 369-70, 314-22. [Fac. Sci., Toulouse, France]

In the first part of this review, information is given on the botanical and vernacular names, the origin and geographical distribution of *Dolichos lablab*, grown in many warm regions of the world as a cover crop, for green manure, forage, and, in some places, for human consumption. It is thought that this species has two centres of origin, one at a high altitude in Abyssinia and one in India.—E.B.O.

510† PAUL, W. R. C. **Notes on legumes. 3.** *Trop. Agriculturist* 1953, **109,** No. 1, 27-35, bibl. 9.

Recommendations are made as a result of trials carried out at numerous stations in Ceylon to determine the suitability of various legumes as green manures, protecting crops and forage crops. The Mauritius velvet bean (*Stizolobium aterrimum*) is an excellent cover and green-manure crop for the dry season from June-September in the arable areas of the dry zone. The seed should be sown during the October or November rains. Stylo (*Stylosanthes gracilis*) is successful as a cover and green-manure crop in the wet zone, especially on lateritic gravels, but is very susceptible to attacks by the larvae of the Buprestid beetle. Spanish clover (*Desmodium uncinatum*), newly introduced from Queensland, Australia, is described. It grew well at Peradeniya, spread quickly, formed a vigorous ground cover and withstood drought. Attention is drawn to the use of *Tephrosia purpurea* as a green manure on paddy land during the dry season when there is insufficient irrigation water for cultivating rice. Once introduced, *T. purpurea* will grow each season after the rice harvest from self-sown seed. *Phaseolus lathyroides* can be used in the same way, but has to be sown each year. *Crotalaria spectabilis* is described. Its foliage is useful as green manure but is poisonous to stock. Methods of growing and utilizing *Sesbania speciosa* as green manure for rice fields are described. The pigeon pea (*Cajanus cajan*) is of value in restoring soil fertility on arable land when grown for a period of 2 years or more. An account is given of the use of Spanish clover, stylo, *Psophocarpus palustris*, *Glycine javanica*, *Ph. lathyroides*, thornless mimosa (*Aeschynomene americana*) and *Desmodium distortum* as forage crops in Ceylon. The fodder trees *Leucaena glauca* and *Prosopis chilensis* are recommended for the dry zone.—W.J.B.

## GENERAL

511† BJÄLFVE, G. Baljväxternas kväveupptagande och deras inverkan på jordens kväveinnehåll under några olika betingelser. [**Nitrogen uptake by legumes and their effect on the nitrogen content of the soil under different conditions.**] *Forhandsmedd. 3. LantbrHögsk. Bäljväxtlab.* 1953, pp. 16, bibl. 9.

A review is given of Scandinavian work.—P.J.B.

512† GEORLETTE, R. Aperçu de travaux récents consacrés à la fixation symbiotique d'azote chez les légumineuses. [**A review of recent work on the symbiotic fixation of nitrogen in legumes.**] *Ann. Gembl.* 1953, **59,** No. 4, 215-36, bibl. 182.

This brief review is in three sections : (1) *Rhizobium leguminosarum* : (2) root nodules : and (3) agricultural applications of rhizobium inoculation.—M.A.

513 Chatterji, S. **On the infestation of bruchids in milled and unmilled pulse (mung).** *Sci. and Cult.* 1953, **9,** No. 6, 305. [Ent. Div. Indian Agric. Res. Inst., New Delhi]

A laboratory experiment was carried out in 1948 to determine the influence on damage by bruchids (*Bruchus analis*) to pulses of the following four conditions of the grain: (a) whole pulse with skins, (b) decorticated whole pulse, (c) broken pulse with skins, (d) broken pulse without skins. *Phaseolus mungo*, *Ph. radiatus*, *Lens esculentus*, chick-pea (*Cicer arietinum*), pigeon pea (*Cajanus cajan*) and pea (*Pisum sativum*) were the pulses used. After 5 months storage in contact with bruchids the loss in weight of the pulses during storage was determined. The loss in weight after storage was significantly less with treatment (c) and (d) than with (a) and (b). The relatively small damage done by bruchids to the broken, compared with whole, grains is attributed to the unfavourable effect on bruchid grub development of the dryness and smallness of the broken fragments.—W.J.B.

# ROOTS

## SUGAR- AND FODDER-BEET

514 Thompson, E. G. **Sugar-beet strains. Official trials reviewed.** *Brit. Sug.-Beet. Rev.* 1953, **22,** No. 1, 21-3, illus.

Results from sugar-beet varietal trials at 17 centres in Great Britain in 1952 are compared with similar figures for the years 1950 and 1951. The average calculated yield of washed roots, tops and sugar per acre, expressed as a percentage of the mean of control varieties, the average percentage of sugar in the roots and the average percentage of bolters in the crops are tabulated. When compared with figures from the 1950 and 1951 trials, the relative order of yield showed no great change, the highest yield of sugar per acre again being given by Klein E (German). Under conditions where bolting was serious, the 4 strains, Battle's E, Klein E (German), Sharpe's Klein E and Bush gave the lowest proportion of bolters.—M.A.

515 Thompson, E. G. **Bolting in sugar-beet. A comparison of the strains.** *Brit. Sug.-Beet Rev.* 1953, **22**, No. 2, 55.

A table gives the average percentage of bolting in sugar-beet, for 1951-3, recorded from special early-sown observation plots by the NIAB. Of strains not included in the seed list of the British Sugar Corporation but grown in special observation plots, Klein AA showed a lower percentage of bolters than any of the listed strains in 1952 and 1953.—M.A.

516 Campbell, G. K. G. **Selection of sugar-beet for resistance to bolting.** [Reprint from] *Proc. 16th Meet. Inst. Internat. Rech. Better.* 1953, pp. 5.

A brief account is given of techniques in use at the Plant Breeding Institute, Cambridge, for selecting sugar-beet for resistance to bolting. Data are given of the percentage of bolters in lines selected for resistance to bolting.—P.J.B.

517 Kock, P. C. de and others. **A germination inhibitor from sugar-beet.** *J. exp. Bot.* 1953, **4,** No. 12, 272-82, bibl. 22, illus. [Bot. Dep., Univ. Aberdeen]

There is present in the water extract of sugar-beet seed balls an unsaturated yellow oil which is capable of inhibiting germination of various seeds. It also inhibits salt uptake and the respiration of sugar-beet tissue disks. The activity of the polyphenolase enzyme present in the beet tissue is also depressed. The role of the oil in inhibition of sugar-beet germination is discussed.—Authors' summary.

518 Zwijns, M. J. and Feekes, F. H. Proeven over zaadontsmetting met tetra-methyl-thiuraam-disulfide (TMTD of Thiram) en chinonen. [**Experiments on seed-dressing with tetra-methyl-thiuram-disulphide (TMTD or Thiram) and quinones.**] *Meded Landb-Hogesch., Gent* 1953, **18,** No. 2, 492-512, illus., English summary p. 505.

The results of trials on the use of TMTD and the quinones 2,2-dichloro, 1,4-naphthoquinone and tetrachloro-para-benzoquinone for treating the seeds of maize, bean, sugar-beet and pea under cold-test conditions, showed the superiority of these materials, in terms of improved seedling emergence, over organic mercury compounds. TMTD was slightly superior to the quinones. TMTD was much superior to organic mercury compounds and to tetrachloro-para-benzoquinone in protecting sugar-beet seed from attack by *Phoma betae*.—P.J.B.

519 Enikeev, S. G. [**The mechanism of the formation of cavities in sugar-beet.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **92,** No. 2, 431-4, bibl. 4, illus. [Kirgiz Agric. Inst.]

In regions where beet sowings are irrigated, a condition develops in sugar-beet, so-called "hollowness," which may spoil as much as 80% of the roots. This hollowness may be divided into two types, namely, a root-head cavity (most common) and a cavity along the central axis (a rarer occurrence). The condition may appear in both fodder-beet (up to 60% of sowings) and table-beet (10-15% of sowings). It has been claimed that hollowness is the result of mechanical splitting of the parenchyma in the root-head following too active root growth, but the author has observed, in beet sowings (3 replications) of the collective farms of the

Kirgiz SSR, that cavities form even when the root does not weigh more than 10g. and when leaf growth is more active than that of the root. An account is given of the occurrence in sugar-beet of cavities in the so-called cavity-parenchyma and this tissue is distinguished from the initial parenchyma in regard to cell structure and chemical composition. The cavity-forming parenchyma contains 4·4% less sugar than the initial parenchyma, but a much greater quantity of ash; thus, ash substances are concentrated at points where cavities are apparently incipient. Hollowness appears first as a stain in the root parenchyma above intersecting vessels, the stained cells being less compact than normal; consequently there is disintegration of the cell contents into simple chemical compounds which, it has been claimed, are used as nutrients by the growing apex. In order to study the reaction between the growing apex of the root and cavity formation, the author, in 1951, made tests in which the growing apex of sugar-beet was removed at different dates. Results showed that by removing the tip on 13 June (sowing or planting date not given) no cavities appeared; with apex removal on 4 July, 30% of the roots developed cavities; with removal on 2 August, 70% of the roots developed cavities. It was noted that if the cavity-forming parenchyma was totally removed at the time when cavities first appeared, then there was no occurrence of hollows in the initial parenchyma.—M.H.

520 CHOLLET, Marie-Madeleine. Métabolisme du raffinose dans les tubercules de betterave. [**Raffinose metabolism in the roots of beet.**] *Mèm. Soc. bot. Fr.* 1952, 170-6.

Data are given of the saccharose and raffinose content of sugar-beet and fodder-beet roots at different stages of growth.—P.J.B.

521† SCARAMELLA PETRI, Piera. Criterio diagnostico per determinare la concentrazione zuccherina nelle varietà di barbabietola. [**A diagnostic criterion for determining the sugar content in beet varieties.**] *Industr. saccar. ital.* 1953, **46,** No. 9-10, 336-44, bibl. 10, illus. [Ist. Bot., Univ. Bologna, Italy]

This histological study, which is still in the preliminary stage, carried out with 7 varieties of sugar-beet and 1 of fodder-beet, indicated that there is a direct relation between the quantity of phloem in the bundles of the leaf-stalk and the sugar content in the root. [See also *Fld Crop Abstr.* 5 : 843.]—E.B.O.

522 ANTONELLI, C. Secondo contributo sperimentale sulla diagnostica fogliare applicata alla bietola zuccherina. [**Second experimental contribution to foliar diagnosis applied to sugar-beet.**] *Industr. saccar. ital.* 1953, **46,** No. 11-12, 413-18, bibl. 5.

From 2 years' trials carried out in Italy it is concluded that Bray's reagent can be employed effectively as an indicator for the early diagnosis of N deficiency in sugar-beet crops in delicate laboratory and field tests, but cannot be adopted, at least for the present, in general agricultural practice. [See also *Fld Crop Abstr.* 6 : 1016.]—E.B.O.

523 KAUDY, J. C. and others. **Relation of sodium uptake to that of potassium by the sugar beet.** *Agron. J.* 1953, **45,** No. 9, 444-7, bibl. 9. [Soils Dep., Univ. Wisconsin, Madison]

Studies are reported on the uptake of Na and K by sugar-beet grown on a number of soils in Wisconsin. Determinations of the available exchangeable Na and K in the soils showed that the ratio of Na to K ranged from 1 : 7 to 1 : 15, with an average value of 1 : 10. The ratio of Na to K in composite plant tissue averaged 1 : 2·2; in petiole tissue, 1 : 2·7. From these results, it was apparent that a proportionately larger amount of Na than K was removed from the soil by the plants. The variation in the ratio of Na to K in the plant was much less than that of the actual content of these elements in the soils or plants. The amount of Na or K in the leaf tissue of the plants was significantly and positively correlated with the amount of available Na or K in the soil. This correlation did not imply that any inter-relationship existed between Na and K, except possibly in the case of the youngest leaf tissues. The ratios of Na to K in the root bases, root crowns, young leaf petioles, aged leaf petioles, young leaf blades and aged leaf blades, were 1 : 17, 1 : 12·4, 1: 13·7, 1:3·6, 1:8 and 1:1·5, respectively, illustrating the narrowing of the ratio of Na to K from both root to leaf and from young to old leaves, and also the relatively greater rate of absorption and translocation of Na than K within the plant. It appeared probable that Na was absorbed and translocated independently of K. Petiole tissue of the fully-mature leaf, rather than fully-mature leaf-blade tissue, or composite tissue of various ages, was best suited for use in assessing the Na status of sugar-beet plants.—P.J.B.

524 PAAUW, F. van der. Kalibemesting en boriumgebrek. [**The influence of potash manuring on boron deficiency disease.**] *Landbouwk. Tijdschr., Wageningen* 1954, **66,** No. 1, 32-5, bibl. 3, illus., English summary p. 35. [Agric. Res. Sta. T.N.O., Groningen]

The influence of the rate of application of lime and potash to the soil on the appearance of symptoms of boron deficiency in sugar- and fodder-beet was studied in an experiment in which lime was applied at three rates, to give pH values varying from

4·35 to 7·15, and potash manure at rates of 0, 60, 150 and 300 kg. of $K_2O$ per ha. At high rates of $K_2O$ application (150 kg. per ha. or more), there was a marked decline in yields (especially of leaf), accompanied by symptoms of boron deficiency. The Bo content of the leaves was only slightly depressed by high rates of lime and potash application.—W.J.B.

525 SCHEIJGROND, W. and VOS, H. Het gebruik van een handrefractometer bij de drogestofbepaling van voederbieten. [**The use of a hand refractometer for determining the dry-matter content of fodder-beet.**] *Euphytica* 1953, **2,** No. 3, 229-33, illus., English summary pp. 232-3.

Notes are given on the use of a hand refractometer for obtaining rapid approximate estimates of the dry-matter content of fodder-beet. Data are given showing the correspondence between refractometer values obtained from exuded sap and from sap expressed from crushed root samples. A table is given for converting refractometer values, obtained from exuded and expressed sap, to sugar- and dry-matter contents.—P.J.B.

## MANGEL AND TURNIP

526 WILLEY, L. A. **Mangel and swede comparative trials, 1945-46.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 468-74, bibl. 3.

From field trials to compare the mangel and swede crops in England in 1945 and 1946, it was concluded that mangels can be expected to give higher yields of dry-matter than swedes in southern England. In the series of trials reported, mangels gave over 100% higher yields of dry-matter than swedes at southern centres while the trials in the north of England resulted in almost equal yields for the two crops. The varieties used were : mangels : Kirsches Ideal, New Century and White Chief ; swedes : Purple King, White Flesh and Wilhelmsburger.—C.L.S.

527 FLOVIK, K. and OPSAHL, B. Forsøk med sortar og stammer av nepe. 1947-1951. [**Trials with different varieties and strains of turnip (in Norway). 1947-1951.**] *Forskn. Fors. Landbr.* 1953, **4,** No. 2, 121-42, bibl. 15, English summary p. 141.

The trials were carried out at 6 locations in Norway. Average yields for all locations, except the 2 northernmost near Bodø and Tromsø, were headed by Yellow Tankard Vidarshov I, followed by Yellow Tankard Roskilde IX, Weibull's Bortfelder Tellus, Forus' Kvit Mai, Weibull's Immuna II, and the Bortfelder types Vidarshov I and Rogaland, with average root dry-matter yields in metric tons per ac. of 2·76, 2·71, 2·70, 2·66, 2·62, 2·56 and 2·51, respectively. The dry-matter content of the roots ranged from 8·3 to 9·3%, except in the case of Forus' Kvit Mai, which had 12·1%. Leaf yields ranged from 6·5 to 7·59 metric tons per ac., except for Forus' Kvit Mai and Weibull's Bortfelder Tellus, which yielded 5·74 and 8·42 tons per ac., respectively. In south-western districts, Weibull's Immuna II gave the highest yields. Weibull's Bortfelder Tellus and the Yellow Tankard strains gave the highest yields in eastern districts, while in northern districts, the Yellow Tankard strains were superior. In the Trondhjem and Stenkjaer districts, Forus' Kvit Mai significantly outyielded other varieties. This last variety was also highly resistant to *Plasmodiophora brassicae*, as, to a lesser extent, was Weibull's Immuna II. Yellow Tankard varieties were superior to other varieties in resistance to *Cortophila* sp.—P.J.B.

## POTATO

528 DINGWALL, A. R. **Main-crop potato production in Canterbury.** *N.Z.J. Agric.* 1953, **86,** No. 6, 531-48, illus. [Dep. Agric., Christchurch, N.Z.]

529 RIEMAN, G. H. and others. **Potato tuber development. 1. The Russet Burbank variety : influence of seed-piece origin and spacing on tuber size and shape.** *Amer. Potato J.* 1953, **30,** No. 4, 98-103, bibl. 1, illus. [Wisconsin Agric. Exp. Sta.]

The following are the principal results from the trials described : (a) the 21-in. spacing in rows 3 ft. apart was the best, as it produced the highest yield of US1 size A and large (Jumbo) potatoes, closely followed by the 18-in. and 24-in. spacings ; (b) there was a gradual but consistent increase in the volume of knobby tubers as the spacing distance was increased from 12 to 30 in. ; (c) seed-pieces weighing 1·5 oz., cut from tubers 1·875 in. in diameter, up to a maximum of 10 oz. in weight, produced the highest yield of US1 size A and Jumbo potatoes in the seed treatment trials ; seed-pieces cut from Jumbo tubers over 10 oz. in weight produced the highest yield of Jumbo potatoes ; (d) nearly all hills with 1 stem produced knobby tubers, whereas hills with 3 or more stems produced only a few knobby tubers ; tuber size decreased and the number of tubers increased as the number of stems per hill increased from 1 to 6 ; 3 stems per hill produced the highest yield of US1 potatoes over 6 oz. in weight.—E.B.O.

530 INGEBRIGTSEN, S. Forsøk med ulik rad- og setteavstand for potet og ulik settepotetstørrelse, og forsøk med ulike sterk gjødsling og forskjellig setteavstand. [**Experiments

**with different sizes of seed potatoes and varied spacing of drills and setts, and experiments with different rates of fertilizers at varied seed sett spacing.**] *Forskn. Fors. Landbr.* 1953, **4,** No. 2, 143-57, bibl. 9, English summary p. 156. [State Exp. Sta., Holt, Tromsø, Norway]

The trials were carried out near Tromsø during 1940-3. Three row spacings of 50, 60 and 70 cm. were used, with spaces of 15, 20, 25, 30, 35 and 40 cm. between seed potatoes in the row. Seed sizes used were: 25, 50 and 100 g. Highest tuber yields and dry-matter yields were obtained from 50 cm. row spacings. With Keiserkrone, tuber yields for rows 50, 60 and 70 cm. apart averaged 2353, 2245 and 2033 kg. per decare, with net tuber yields (tubers above 3·5 cm. in diameter) of 1900, 1890 and 1740 kg. per decare, respectively. Row spacings of 60 cm. were considered the most economically desirable. Seed potatoes 25, 50 and 100 g. in weight produced net average tuber yields of 1708, 1909 and 1913 kg. per decare, respectively. Mean total tuber yields where spaces between seed tubers in the row were 15, 20, 25, 30, 35 and 40 cm. were 2195, 2005, 1867, 1765, 1740 and 1631 kg. per decare, respectively. The proportion of small tubers was highest where spacings between plants were smallest. The most economic spacing between plants in the row was 20-25 cm. In combined seed tuber spacing trials and manurial trials, spacings between seed tubers in the row were: 20, 30 and 40 cm. and manurial treatments were: (a) farmyard manure (about 3500 kg. per decare) + 10 kg. $K_2SO_4$, 10 kg. nitrochalk and 25 kg. superphosphate per decare; (b), as for (a), but with an additional 30 kg. of complete artificial manure. Interactions between plant spacing and manurial treatment were not significant, though heavy manurial treatments appeared to render 30 cm. spacings in the row better able to compete, in terms of tuber yields, with 20 cm. spacings. Heavy manurial treatments appeared to cause a considerable reduction in the dry-matter yields of plants grown from seed tubers spaced 20 cm. apart in the row.—P.J.B.

531 Díaz de Mendívil, J. M. V. and Escribano, F. I. Ensayos sobre patata realizados durante el período 1944 a 1948. [**Potato trials carried out during 1944-8.**] *An. Inst. Invest. agron.* 1953, **2,** No. 3, 227-341. [Esta. Mejora Patata, Vitoria, Spain]

An account is given of trials carried out to investigate the following points: (a) influence of size of seed potatoes (entire or cut) on yield; (b) influence of different spacings on yield; (c) behaviour of different varieties. In the spacing trials, distance between the rows was kept at 65 cm., while between plants in the row it varied from 30 to 70 cm. The following were the conclusions for (a): entire tubers are preferable for planting; the largest tubers give the highest yields; tubers of less than 50 g. should not be planted; tubers of less than 100 g. should be planted entire; tubers should not be cut into more than 2 pieces. As to (b) the highest yields were obtained from the spacing 65 × 30 cm. Detailed results are given for (c). [See also *Fld Crop Abstr.* 6: 644 and 1029.]—E.B.O.

532 Moursi, M. A. **The effect of depth of planting on germination, level of tuber formation and yield of the potato crop.** *Amer. Potato J.* 1953, **30,** No. 10, 242-6, bibl. 5, illus.

In a trial carried out at Dryden Mains, Edinburgh Univ. Agric. Exp. Farm, potatoes were planted at depths of 2 in. and 5 in. Results indicated that: (a) shallow planting hastened the speed of plant emergence; (b) the difference in depth of planting had no effect on establishment; (c) taking the median of the frequency distribution of the level of tuber formation, planting at 2 in. developed tubers at 2·6 in., whereas planting at 5 in. developed tubers at 3·4 in.; (d) similar yields were obtained from the 2 in. and 5 in. depth of planting.—E.B.O.

533 Cullen, J. C. **Maincrop potato variety trials, 1942-52.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 361-95, bibl. 1.

The results of yield trials [in Gt Britain] of maincrop potato varieties during the period 1942-52 are considered in detail. Four groups of varieties were involved: Majestic, Arran Peak, Ulster Commerce, Arran Banner, Great Scot, King Edward and Gladstone; Up-to-date, Dunbar Standard and Kerr's Pink; Majestic, Arran Viking, Stormont Dawn, Stormont Star, Ulster Cromlech and Ulster Earl; Majestic, Arran Peak, Craig's Snow White, Dr. McIntosh, Ulster Leader and Ulster Supreme. Evidence for local suitability is examined and a relationship between two of the varieties, Dr. McIntosh and Ulster Supreme, and average yield for the centre is discussed.—Author's summary.

534 Manner, R. Erfarenheter av Hammenhögs Privera-potatis. [**Experiences with Hammenhögs Privera potato.**] *Hammenhög's Ann. Cat.* 1954, Spring, 13.

Privera, an early variety, was placed on the market in Sweden in 1952. In trials in south Sweden during 1950-3, it outyielded Early Puritan by 3·2, 7·6 and 15·9% at the first, second and third week's harvest. The cooking and keeping quality of Privera equalled that of other early and medium-early varieties.—P.J.B.

535 Grover, O. and Turnquist, O. C. "**Red-**

**burt": a new potato variety.** *Amer. Potato J.* 1953, **30,** No. 8, 186. [St. Paul, Minn.]

536 BOOCK, O. J. Variedades de batatinha (*Solanum tuberosum* L.) procedentes da Polônia. [**Tests with varieties of potatoes obtained from Poland.**] *Bragantia* 1951, **11,** No. 10-12, 291-6, bibl. 1. [Agron. Inst. Campinas, São Paulo State, Brazil]

At 3 centres in the State of São Paulo, Brazil, the yields of seed potatoes of the varieties Dar, Oka, Bem, Pionier and Kolobrzeskie (all imported from Poland) were compared with that of the variety Eigenheimer. The appearance and field behaviour of the Polish varieties are described. The results varied considerably from area to area. On the average of all experiments, Eigenheimer outyielded all other varieties ; the two highest-yielding Polish varieties were Oka and Kolobrzeskie. The varieties, Kolobrzeskie and Bem, yielded larger percentages of large-size potatoes (over 80 g.) than any other varieties tested. Pionier and Kolobrzeskie showed good resistance to late blight (*Phytophthora infestans*) and early blight (*Alternaria solani*).—W.J.B.

537 ESTRADA, N. Una variedad de papa con buenas caracteristicas para cultivar en los páramos colombianos. [**A good potato variety for cultivation in the Colombian uplands.**] *Agric. trop.* 1953, **9,** No. 12, 21-6, bibl. 3, illus. [Potato Exp. Sta., Usme, Colombia]

Particulars are given of the potato variety Londres (*Solanum tuberosum* spp. *andigenum*) which outyielded other varieties grown in the Colombian uplands (2900-3500 m.) in trials held in 1952-3. Particulars are also given of the specific weight, starch and dry-matter content of Londres and of the other varieties with which it was compared.—W.J.B.

538 CASSERES, E. H. Tres nuevas variedades de papas resistentes al tizón tardío. [**Three new varieties of potato resistant to late blight.**] *Turrialba* 1953, **3,** No. 3, 86-90, bibl. 4, illus.

Three new varieties of potato highly resistant to late blight (*Phytophthora infestans*), namely, Ticanel, Rosanel and Güetar are described. The new varieties outyielded existing local varieties in trials in Costa Rica. They were selected by the Inter-American Institute of Agricultural Sciences from material developed by Cornell University. *Solanum demissum* was used as the source of blight resistance.—W.J.B.

539 STERTEN, A. K. Potetforsøk i fjellbygdene 1941-47. [**Potato trials in upland districts** (of **Norway**).] *Forskn. Fors. Landbr.* 1953, **4,** No. 2, 81-118, bibl. 6, German summary pp. 109-12.

The studies were carried out at the Løken Experiment Station in the mountain areas of central Norway and consisted of combined varietal trials and trials to compare the yield of sprouted and unsprouted seed tubers. Eleven varieties were compared, with Sagerud used as a standard. During 1941-7, Åspotet, Saga and Hj × R.J. 264 gave average yields of 632, 515 and 495 kg. per decare more than Sagerud, respectively. Over a 3-year period, Grahm (Up-to-date) and King George V outyielded Sagerud by 547 and 687 kg. per decare, respectively. Åspotet, in most years, outyielded other varieties in terms of both fresh weight and dry-matter yields, particularly in low-lying areas of upland districts. Notes are given on the characteristics of the varieties used in the trials. In trials comparing the yield of plants grown from sprouted and unsprouted tubers, yields from sprouted tubers of Sagerud during 1920-31, 1932-42 and 1941-47 were increased by an average of 742, 244 and 148 kg. per ha., respectively. The steady reduction in yield advantage of sprouted over unsprouted tubers was considered to be due to a progressive amelioration in the climate, which permitted progressively earlier planting of unsprouted tubers. This progressive decline in yield advantage was greater in Sagerud than in Grahm. During the period 1941-7, yield increases resulted in only 4 out of 7 years. In trials during 1950 with Eigenheimer, sprouted tubers planted on 7 May gave higher tuber yields than unsprouted tubers by reason of increased tuber numbers. Yields of sprouted tubers planted on 19 May were higher than those of unsprouted tubers by a greater margin than those sown at the first date, mainly owing to increased yields of medium-sized tubers. Still greater yield increases of sprouted, as compared with unsprouted tubers, were obtained from sowings made on 29 May, an effect solely due to increased tuber size, though tuber numbers declined. There was considerable difference between varieties in their reaction, in terms of yield increases, to sprouting.—P.J.B.

540 MÜNSTER, J. Technique de l'identification variétale des tubercules de pommes de terre. [**The technique of varietal identification of potato tubers.**] *Rev. rom. Agric.* 1953, **9,** No. 11, 86-8, illus.

The examination of the morphological characteristics of the potato tuber : skin colour, colour of flesh, shape and depth of eye, can be usefully extended to include an examination of the sprouts. Methods of stimulating germination and a description of the sprouts of Bintje, Erdgold and Ackersegen are given.—M.A.

541 SAPTHARISHI, K. and AZARIAH, M. D. **Breaking the rest period of potato seed. A review of trials at the Agricultural Research**

**Station, Nanjanad.** *Madras agric. J.* 1953, **40,** No. 9, 414-19, bibl. 13.

The literature on the subject of inducing early sprouting in potatoes is discussed in relation to the shortage of sprouted potatoes commonly experienced in the Nilgiris, India, at the time of planting the second potato crop. Experiments in 1944-8 are described in which a comparison was made of the yields of tubers obtained from seed potatoes harvested a few weeks before subsequent planting and subjected to the following treatments to induce early sprouting : (a) peeling of the skin followed by 15 days' storage in moist sawdust, (b) fumigation with carbon disulphide, (c) stacking in lofts over a hearth. Method (b) was found to give the most satisfactory results ; (c) was found to be a suitable method for small-scale growers.—W.J.B.

542 POMME de TERRE FRANÇAISE. Bibliographie sur l'étude de la suppression de la dormance des tubercules de pomme de terre. [**A bibliography on the study of breaking dormancy in potato tubers.**] *Pomme de terre fr.* 1953, **16,** No. 172, 18-20, bibl. 36.

543 BOYD, A. E. W. and HENDERSON, J. Margaret. **Susceptibility of immature potato tubers to blight.** *Pl. Path.* 1953, **2,** No. 4, 113-16, bibl. 5. [Edinburgh and E. Scotland Coll. Agric.]

From studies in which potato tubers were harvested over a period from 9 August to 12 October from plants bearing blight (*Phytophthora infestans*) infection, it was found that resistance to infection increased with the age of the tubers. This effect was not due to a progressive increase in skin thickness. It is concluded that where blight infects foliage early in the season under favourable conditions, more severe infection of the tubers will result than where infection takes place relatively later in the season.—P.J.B.

544 BAZÁN, C. and LAMAS, J. M. Experimento comparativo de fungicidas para el control del "hielo" de la papa en el valle de Carabayllo. [**Comparative trials of fungicides against late blight in potatoes, in the Carabayllo Valley, Peru.**] *Informe 81. Esta. Exp. Agric. La Molina, Peru* 1953, pp. 16, illus., English summary p. 16.

The effect of sprays of the fungicides Fytolan, Perenox, Dithane Z-78, Cuprifero Shell and Copper A compound (Du Pont) on the incidence of late blight (*Phytophthora infestans*) in potatoes (*Solanum tuberosum* ssp. *andigenum* and *S. goniocalyx*) was tested in 1952. The potatoes were planted in June-July and the sprays applied in August-October. Dithane Z-78 gave a significantly better control of the disease than any other fungicide but the remaining fungicides all reduced the incidence of the disease by about 50%. The average yields of *S. tuberosum* were approximately 10,000 kg. per ha. on plots treated with Dithane Z-78, 6-8 thousand kg. per ha. on other plots treated with fungicides and 3000 kg. per ha. on untreated plots. There was a significant negative correlation between the degree of incidence of *Ph. infestans* and the yields of both *S. tuberosum* ssp. *andigenum* and *S. goniocalyx.*—W.J.B.

545 WOODCOCK, E. F. **The correlation between the number of lenticels on potato tubers and the susceptibility to the potato-scab organism (*Streptomyces scabies* (Thaxt.) Waksman and Henrici).** *Pap. Mich. Acad. Sci.* 1953, **37,** Pt. 1, 109-11. [Michigan State Coll., East Lansing]

It was concluded that there was no correlation between the number of lenticels present in the skin of the tubers of 6 potato varieties, and their susceptibility to potato-scab disease.—P.J.B.

546 GUILLEMAT, J. Le traitement des tubercules de pomme de terre dans la lutte contre les sclérotes de *Rhizoctonia solani* Kuhn. [**The treatment of potato tubers for controlling the sclerotia of *Rhizoctonia solani* Kuhn.**] *Pomme de terre fr.* 1953, **16,** No. 172, 10-15, bibl. 10. [Lab. Bot. ENA, Grignon, France]

Trials to control *Rhizoctonia solani* on seed potatoes stored in open containers, using aerosols of formol, indicated that effective control was obtained when formol was applied at the rate of about 40 cc. per cu. m. of storage room. Although this treatment did not appear to be phytotoxic, it is considered inadvisable to treat germinated or injured potatoes. —E.B.O.

547 GRAINGER, J. **Control of the potato root eelworm.** *World Crops* 1954, **6,** No. 1, 17-22, bibl. 17, illus. [West Scotland Agric. Coll.]

Research work on the control of the potato root-eelworm (*Heterodera rostochiensis*) is reviewed and the efficacy of different chemical methods of control is discussed, with special reference to the use of DD (dichloropropane-dichloropropylene mixture). Economic aspects of the use of DD are also discussed.—W.J.B.

548 LANDIS, B. J. and GIBSON, K. E. **Observations on the effectiveness of DDT, Parathion, and Malathon against the iris whitefly [*Aleyrodes spiraeoides*] on potatoes.** *Amer. Potato J.* 1953, **30,** No. 9, 213-20, bibl. 1. [Washington Agric. Exp. Sta.]

549 BARTELS, R. Ein Beitrag zur Frage der Wurzelübertragung des Kartoffel-X-Virus. [**The question of root transmission of potato virus X.**] *Züchter* 1953, **23,** No. 9, 280-4,

bibl. 9, illus. [Biol. Bundesanst. Land- u. Forstwirtschaft, Braunschweig-Gliesmarode]

A two-year experiment is described which confirms the root transmission of virus X demonstrated by F. M. Roberts (*Ann. appl. Biol.* 1950, 37, 385-96, etc.) and M. Klinkowski (*Mitt. Biol. Zentralanst.* 1951, 70, 59-61 and 64). Seven potato varieties were used. The rate of tuber infection differed according to variety, but in every case was very low (maximum 3%), so that the underground spread of virus X is considered of no great consequence.—G.M.R.

550 BERCKS, R. Fortgeführte Untersuchungen über das Infektionsvermögen verschiedener X-Virusherkünfte gegenüber Kartoffeln. [**Continued research on the ability of virus X from different sources to infect potatoes.**] *Züchter* 1953, **23,** No. 10/11, 289-93, bibl. 10. [Biol. Bundesanst. Land- u. Forstwirtschaft, Braunschweig-Gliesmarode]

Most of the 15 viruses tested were capable of infecting all the 15 potato varieties which comprised the experiment material.—G.M.R.

551 RHANNA, M. L. and GANGULY, B. **Loss in yield in Craig's Defiance potato variety due to virus 'Y.'** *Sci. and Cult.* 1953, **19,** No. 5, 257-9, bibl. 7. [Potato Breed. Substa. Simla, India]

552 BAGNALL, R. H. **The spread of potato virus Y in seed potatoes in relation to the date of harvesting and the prevalence of aphids.** *Canad. J. agric. Sci.* 1953, **33,** No. 6, 509-19, bibl. 18. [Bot. and Pl. Path. Div., Sci. Serv., Canada Dep. Agric., Fredericton, N.B.]

553 ARENZ, B. Methodische Versuche zur Ermittlung von Resistenztypen bei Y- und Blattrollvirus an 26 Kartoffelsorten. [**Experiments to determine types of resistance to virus Y and leaf-roll virus in 26 potato varieties.**] *Züchter* 1953, **23,** No. 10/11, 341-6, bibl. 7. [Bayr. Landessaatzuchtanst., Weihenstephan]

The resistance of varieties was found to differ to the following extents: (1) aphid attack, 3·3-92·9 aphids; (2) successful infection, 8·3-100%; (3) speed of infection, 24-53 days; (4) percentage of diseased tubers per infected plant, 6·7-83·2 in the case of virus Y and 23·6-100 in the case of leaf-roll virus. It is probable that in some varieties resistance increases as the plant ages.—G.M.R.

554 FERNOW, K. H. and KERR, S. H. **Leafroll control by use of insecticides.** *Amer. Potato J.* 1953, **30,** No. 8, 187-96, bibl. 13. [Cornell Univ., Ithaca, N.Y.]

An account is given of trials conducted in 1951-2 in controlling leafroll of potatoes by insecticidal treatment. The use of Parathion, applied at frequent intervals, is recommended.—E.B.O.

555 DEMEL, Johanna, and WENZL, H. Die Sortenanfälligkeit der Kartoffeln gegen Fadenkeimigkeit. [**Varietal susceptibility to hair sprout in potatoes.**] *Bodenkultur* 1953, **7,** No. 2, 142-51, bibl. 12. [Bundesanst. Pflbau und Bundesanst. Pflsch., Vienna]

During several years' study of the subject, the percentage of tubers with hair sprouts in early potatoes has been as high as 90 in some years. The attack was found to be governed by dry and hot conditions during tuber development and to be connected with the wilt caused by *Colletotrichum.* With certain exceptions, early potatoes are most liable to attack and susceptibility is lower, the later ripening the variety. The degree of susceptibility is not significantly affected by the material's stage of development, whether this be the original seed potato or the first or second year's local reproduction. In late varieties, small tubers are more susceptible to the disease than larger ones. There is no connexion between starch content of tubers and susceptibility to hair sprout. Lifting early varieties while still unripe (beginning of July) instead of at the normal time (August) considerably reduces the number of diseased tubers. Late planting (end of June instead of in April and May) achieves the same object.—G.M.R.

556 RAMOS, N. E. Factores ecologicos en la adaptación de especies y variedades de papas. 1. Luz y temperatura. [**Ecological factors in the adaptation of species and varieties of potatoes to environment. 1. Light and temperature.**] *Agric. trop.* 1953, **9,** No. 8, 39-47, bibl. 26, illus.

The literature on the behaviour of *Solanum tuberosum* bolters in the upland zones of Colombia is discussed. In general, bolters (which are adapted to short days) yield better than normal plants of European varieties of *S. tuberosum* (adapted to long days) under Colombian conditions; the superiority of the former becomes increasingly marked at progressively higher altitudes. In experiments carried out in 1952-3, at an altitude of 2600 m., varieties of *S. tuberosum* introduced from the Netherlands showed better adaptation (indicated by improved growth and yields) to Colombian conditions in the second year of cultivation than in the first. After 4 years of cultivation in Colombia, a Dutch variety of *S. tuberosum,* Doré, reverted to a type closely resembling *S. andigenum.* Cases in which clones of European varieties of *S. tuberosum* have both assumed the morphological form of *S. andigenum* and given increased yields after being continuously grown in the Colombian highlands have not yet been recorded at heights above 2700 m.—W.J.B.

557 SCHWIMMER, S. **Enzymes : enzyme systems of the white potato.** *J. agric. Fd Chem.* 1953, **1,** No. 17, 1063-9, bibl. 110. [West. Reg. Res. Lab., Albany, Calif.]

A survey is given of certain aspects of the enzyme chemistry of the potato *Solanum tuberosum.*—P.J.B.

558 WOODWARD, C. F. and TALLEY, E. A. **Review of the nitrogenous constituents of the potato. Nutritive value of the essential amino acids.** *Amer. Potato J.* 1953, **30,** No. 9, 205-12, bibl. 21. [Bur. Agric. Industr. Chem., U.S. Dep. Agric.]

559 CHAPMAN, H. W. and LOOMIS, W. E. **Photosynthesis in the potato under field conditions.** *Pl. Physiol.* 1953, **28,** No. 4, 703-16, bibl. 24, illus. [Dep. Hort., Univ. Nebraska, Lincoln, and Dep. Bot., Iowa State Coll., Ames, Iowa]

Rates of $CO_2$ absorption were measured by determining the difference in $CO_2$ content between a measured stream of air and an equal volume of similar air that had been drawn over an enclosed potato leaf. The average variability in rates of $CO_2$ absorption by paired leaves of potato under field conditions was 28% and the coefficient of variability was 95%. In spite of such variability, evolution of $CO_2$ from leaves in light was not observed, even on permanently wilted plants. Even with 5 × normal $CO_2$, the maximum concentration used, photosynthesis showed a temperature coefficient of approximately unity over the range 18-40°C. Photosynthesis in wilted leaves averaged half that in non-wilted leaves. After watering permanently wilted plants, the rate of recovery of photosynthesis by leaves was directly dependent on the duration of the period of wilting.—From authors' summary.

560 BURTON, W. G. and MANN, G. **Late storage of potatoes in England and Wales.** *Agriculture, Lond.* 1954, **60,** No. 10, 466-72. [Dep. Sci. Industr. Res. Lab., Ditton, Kent]

The economics of storing potatoes in such a way as to prevent losses by sprouting in the period March-July are discussed. Three methods of preventing stored potatoes from sprouting, fan-ventilation of an insulated store with air from outside the store, ventilation of an insulated store supplemented by refrigeration and ventilation with amyl alcohol vapour, are described. The critical temperature range, above which potatoes are likely to sprout in the period March-July, is 40-42°F. In the climate of England and Wales it is not normally possible by fan-ventilation alone to maintain potatoes in an insulated store at 40°F. or less after mid-March ; it is possible to maintain them at temperatures not far exceeding 42°F. until mid-April. Using fan-ventilation supplemented by a refrigerating plant to supply cool air on warm days, potatoes in an experiment in 1952-3 were stored up to 20 April at an average temperature of 41·3°F. The refrigeration plant was in operation for a total of 640 hr. (including 40 hr. devoted to warming the store during very cold weather). In an experiment in 1951-2, potatoes were stored 6 ft. deep on a slatted false floor in a straw bale enclosure inside a corrugated iron shed and ventilated with air containing amyl alcohol vapour. The concentration of amyl alcohol in the air varied from 0·28 to 0·83 mg. per l. At the end of May when the potatoes were taken out of store the weight of sprout growth on the potatoes treated with amyl alcohol varied from 0 to 2%, compared with 3·5 to 9% on untreated potatoes stored in a similar shed. At present, the use of amyl alcohol to prevent sprouting losses is uneconomic.—W.J.B.

561 HANSEN, F. and GREGERSEN, G. B. Forsøg med opbevaring af kartofler i hus efter fyldning under optagning eller fra markkule. [**Experiments on the storage in houses of potatoes immediately after lifting, or after storage in clamps.**] *Tidsskr. Planteavl* 1953, **56,** No. 4, 601-12, English summary p. 612.

The trials were carried out in Denmark using the following storage methods : (a) storage in wooden containers in houses, with straw covering the potatoes ; (b) as for (a), but no straw covering ; (c) potatoes stored in field clamps for about 1 month before being transferred to houses and covered with straw ; (d) as for (c), but no straw covering on potatoes in houses. In all cases, potatoes were placed in storage immediately after lifting during the first half of October. When lifted, the temperature of the potatoes ranged from 12-15°C. ; at the time of transference from field clamps to houses, their temperature was 5-10°C. In February, their temperature in the houses had fallen to 3-7°C. The depth to which the storage containers were filled ranged from 1·5 to 2 m. Temperatures at a depth of 20 cm. from the surface of the potatoes in the containers were 3°C. higher, and those at the surface were 2°C. higher, than the surrounding air temperatures. The temperatures of potatoes stored according to methods (a) and (b) fell more rapidly during November to March and were maintained at about 1°C. lower than where methods (c) and (d) were used. Where temperatures fell to 3-4°C. in February, no sprouting occurred ; where temperatures were 4-6°C. there was some sprouting, and considerable sprouting when temperatures were 5-7°C. Straw coverings over the stored potatoes maintained them in a dry and sound condition up to the top layer. There were not sufficient indications to draw conclusions concerning the relative effect on storage losses of the different methods of storage.—P.J.B.

562† VERBELEN, J. J. La conservation des pommes de terre. [**Potato conservation.**] *Rev. Agric. Brux.* 1953, **6,** No. 7, 888-98, English and German summaries p. 898.

During the winter of 1951-2, experiments were carried out to determine the loss in weight and chemical changes occurring when potatoes were stored by different methods, either raw or steamed. Untreated Bintje potatoes, from which diseased and damaged tubers had been removed, showed a loss in dry matter, after approximately 5 months storage in a cellar, of 0·94% ; results from other trials with potatoes stored in a clamp showed that, after 127 days, there was a heavy loss in dry matter, calculated to be 30·8%. Untreated Alpha potatoes similarly selected and stored in a cellar showed dry-matter losses after 7 months of 12·23%. Bintje potatoes stored in a drainless silo between layers of sugar-beet pulp for 141 days were found, on removal, to have a fresh appearance and weighed 104% of their original weight, the amount of amides and total sugars being higher in the ensiled potatoes than in the original tubers. When tubers of Bintje were steamed and then ensiled for 142 days in a drained silo, 15% of the original weight of the raw potatoes was lost ; but, when Alpha potatoes were steamed and then ensiled, there was considerably less loss of nutrients than when the potatoes were stored raw.—E.B.O.

563 BOUVIGNE, R. and others. Étude des produits freinant la germination precoce des pommes de terre (tubercules de consommation et plants). [**Studies on potato sprout-inhibiting materials (for culinary and seed potatoes).**] *Meded. LandbHogesch., Gent* 1953, **18,** No. 2, 477-91, bibl. 3, English summary p. 484.

Studies during 1950-2 are reported on the effect of (a) tetrachloronitrobenzene (TCNB), (b) methylnaphthylether, (c) the methyl ester of alpha naphthaleneacetic acid, and (d) IPC, on storage losses in tubers and on the yields of plants grown from tubers stored after treatment with certain of these materials. The varieties used were: Eersteling, Eigenheimer, Voran, Industrie, Bintje and Ackersegen. In preliminary trials, mean storage losses in tubers treated in mid-December, or early March, were reduced by an average of 17%, compared with untreated tubers. Treatments made at the beginning of storage were superior to those made after winter. The most effective material was 3% TCNB, applied at a rate of 450 g. per 100 kg. tubers, followed by material (b) (6% formulation) applied at 100 g. per 100 kg. tubers. In limited trials, applications of 2% IPC at rate of 250-300 g. per 100 kg. tubers in early March to Voran gave results as good as those obtained with TCNB. In trials on the effect of these materials on the subsequent growth of potato plants, IPC markedly inhibited plant growth, there being no evidence of growth for 1 month after planting. Material (c) caused significantly greater growth retardation than the other materials, except for IPC, and for Voran tubers sprouted before planting. In all cases the sprouting of treated tubers before planting gave better yields than unsprouted tubers, particularly in cases where storage temperatures were relatively high. In the case of late varieties, such as Eersteling and Bintje, the differences were not significant. TCNB was slightly superior to material (b) in terms of the tuber yield of plants grown from seed treated with these materials.—P.J.B.

564 FRANKLIN, E. W. and THOMPSON, N. R. **Some effects of maleic hydrazide on stored potatoes.** *Amer. Potato J.* 1953, **30,** No. 12, 289-95, bibl. 6, illus. [Ontario Agric. Coll., Guelph, Canada]

Katahdin potato plants of different maturities were sprayed with MH at concentrations of 1250, 2500 and 5000 ppm. There were no visible effects on foliage in the field, and no significant differences in yield and specific gravity in the tubers before storage, from MH treatment. After storage of the tubers for 6 months under 4 different conditions of temperature and relative humidity, i.e., 32°F. and 75% R.H. ; 40°F. and 90% R.H., 50°F. and 78% R.H. ; 45°F. and 85% R.H. (average), sprouting was found to be inversely proportional to the concentration of MH and proportional to the maturity of the tubers and the storage temperature. The loss in tuber-weight increased with increasing concentrations of MH and increasing vapour-pressure deficit in the storage room, and was inversely proportional to maturity. The specific gravities of tubers from non-sprayed plants and from those sprayed with 5000 ppm. of MH were similar and were significantly higher than the specific gravities of tubers from plants sprayed with 1250 and 2500 ppm. Lower specific gravities resulted from storing at 40°F. than from the other temperatures, and from late planting compared with early planting. Neither the colour nor the flavour of cooked potatoes were affected by MH treatment. Potatoes stored at 32°F. were of a dark colour and had a sweet flavour when cooked. —E.B.O.

565 WILSON, A. R. and DAWSON, J. A. **Residues of tetrachloronitro-benzene on ware potatoes.** *J. Sci. Fd Agric.* 1953, **4,** No. 7, 305-10, bibl. 13.

Polarographic determinations have been made of 2 : 3 : 5 : 6-tetrachloro-l-nitrobenzene (TCNB) residues on ware potatoes treated in autumn with 10 lb./ton of 3% TCNB dust to reduce sprouting in clamp. Results indicate that after normal commercial grading and transport following 4-5 months' storage, concentrations of TCNB on tubers are likely to be about 2 ppm. When the storage period is increased to 6 months, a further reduction to approximately 1 ppm. is probable. The original concentration applied (134 ppm.) is reduced mainly by handling before and after clamping, but losses by evaporation have been shown to occur during storage. Washing still further reduces residues and no TCNB at all was found in the flesh of peeled tubers.—Authors' summary.

## SWEET POTATO

566 Pais de Camargo, A. Espaçamento da batata doce em São Paulo. [**Spacing of sweet potatoes in the State of São Paulo.**] *Bragantia* 1952, **12,** No. 1-3, 1-18, bibl. 9, illus., English summary p. 17. [Inst. Agron. Campinas, Brazil]

The effect of spacing on the total yield and size of sweet potatoes (*Ipomoea batatas*) was studied in experiments carried out at 5 stations in the State of São Paulo, Brazil, in the years 1939-40 and 1948-9. Several combinations of spacings from 60-100 cm. between rows and from 20-50 cm. between plants were tested. The total yield of roots was unaffected by variations in the inter-row width, but decreasing inter-row spacing from 100 to 75 cm. caused a decrease in the number of large-sized (over 800 g.) sweet potatoes. Reductions of the spacing between plants from 50 to 30 cm. and from 30 to 20 cm. caused increases in total yields of roots, increased the proportion of medium-sized (80-800 g.) roots harvested and reduced the proportion of large-sized roots. As a result of the experiments, the following spacings are recommended, according to the type of root desired : (a) for the production of small roots suitable for the São Paulo market, 70-80 cm. between rows and 20 cm. between plants, (b) for the production of roots for other markets where size is less important, 90-100 cm. between rows and 30 cm. between plants, (c) in the case of roots for animal feeding or industrial purposes, 90-100 cm. between rows and 40 cm. between plants.—W.J.B.

567 Ventura, Maria. Osservazioni sulla origine di radici avventizie da cauli. [**Observations on the origin of adventitious roots from the stem.**] *Ann. Bot., Roma* 1951, **23,** No. 3, 534-47, bibl. 5, illus. [Received 1954]

In the sweet potato (*Ipomoea batatas*) and other plants studied, the adventitious roots arising from the stem originate in the interfascicular cambium.—E.B.O.

## OTHER

568 Bakermans, W. A. P. De invloed van de behandeling van het plantbed op de opbrengst van mergkool. [**The influence of nursery management on the yield of transplanted kale.**] *LandbVoorl.* 1953, **10,** No. 9, 339-43. [Cent. Inst. Agric. Res., Wageningen]

As a result of experiments carried out in 1950-1, recommendations are made for the growing of marrow-stem kale in nursery beds in preparation for planting out in July or August on land previously occupied by cereals. The experiments showed that early sowing (25 May) gave much larger transplants, and eventually a significantly greater yield of dry matter, than late sowing (22 June). Further experiments showed that when transplants from any given nursery bed were divided into three groups, large, medium and small, significantly higher yields were obtained from the first than from either of the other two groups. In general only the most vigorous plants should be transplanted and about 50% of the nursery population may be discarded. Plants up to 1 m. in length may be transplanted. Nursery beds should be sown 8 weeks before transplanting and the transplanting should take place before 5 August in order to obtain maximum yields.—W.J.B.

569 Chevalier, A. Labiées du genre *Coleus* Loureiro cultivées dans les pays tropicaux de l'Ancien Monde. [**Labiatae of the genus *Coleus* Lour. cultivated in the tropical countries of the Old World.**] *Rev. int. Bot. appl.* 1953, **33,** No. 369-70, 334-41, bibl. 3.

This is a review of the species and varieties of *Coleus* grown for their tubers, which are used for human consumption.—E.B.O.

# FIBRE CROPS

## COTTON

570 De, B. and Ganguli, P. M. **Cotton in Assam.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 3, 202-29, bibl. 11, illus. [Dep. Agric. Assam]

The botanical classification, geographical distribution, and methods of cultivation of cotton grown in Assam are described. The two varieties most commonly found are *Gossypium arboreum* vars. *cernuum* and *neglectum* form *bengalensis*. The coarse, short-stapled cotton derived from these varieties is marketed as " Comilla " or " Garo Hill " cotton. Cotton occupies about 30,000 acres in Assam, mostly hill land where cotton is grown as part of a mixed crop by tribesmen who practise shifting cultivation. It is suggested that yields of cotton in the Assam hills can best be improved by the use of certain selections from local cottons which have, in trials, outyielded the local cottons by over 100%.—W.J.B.

571 AFZAL, M. **Comilla cotton of East Pakistan.** *Agriculture, Pakist.* 1951, **2,** No. 1-2, 23-31, illus. [Pakist. Cent. Cott. Comm., Karachi]
The cultivation, in the Chittagong Hills, of short and rough staple cotton (*Gossypium arboreum* var. *neglectum*), marketed under the trade name of Comilla, is described. The hills vary in height from 2-3 thousand ft. a.s.l. and annual rainfall ranges from 80 to 100 in., mostly received in summer monsoons. The meteorological data from the area are tabulated. About 50,000 acres of cotton are grown annually on hill slopes by tribal cultivators practising shifting cultivation. Yields of 150-250 lb. of seed cotton per ac. are obtained.—W.J.B.

572 LEONARD, H. B. **The development of cotton production in the Northern Region of Nigeria.** *Emp. Cott. Gr. Rev.* 1954, **31,** No. 1, 12-26, illus.

573 VAIDYA, C. S. **Effect of sowing date and manuring on the yield and its components in desi and American cottons.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 4, 269-78, bibl. 5. [Inst. Pl. Industr., Indore]
The effect of pre-monsoon sowings in May (with irrigation) and monsoon sowings in July (without irrigation), and of applications of N and P at various rates, on the yields of Indore (*Gossypium hirsutum*) and Dhar 43 (*G. arboreum*) cotton was tested in experiments on the black-soil tract at Indore in 1947-9. The average yields of seed cotton per plant for pre-monsoon and monsoon sowings, respectively, were 18·2 and 7·3 g. for Dhar 43 and 18·5 and 6 g. for Indore. The increase of the boll number was responsible for 90-95% of the difference in yield between pre-monsoon and monsoon sowings in the case of both varieties. Applications of phosphate manures caused no appreciable increase in yields. Increases in yield over control (no N) obtained by the use of N ranged from 22 to 30% in response to 25 lb. N per ac. and from 43 to 50% in response to 50 lb. N per ac. The increase of the boll number was responsible for 71-80% of the increase of yield over control (no N) obtained from 25 lb. per ac. N. In general, the contribution of the factor boll number to increases in yield, was 4-5% greater at rates of 50 than at rates of 25 lb. per ac. The response of yields to N applications was significantly greater in pre-monsoon than in monsoon sowings. The treatments had no effect on the number of seeds per boll.—W.J.B.

574 BROWN, L. C. **Chemical defoliation of cotton. 1. Bottom leaf defoliation.** *Agron. J.* 1953, **45,** No. 7, 314-16, bibl. 5. [U.S. Dep. Agric. Fld Sta., Sacaton, Ariz.]
Data are given of the percentage of boll rot and the number of open bolls per 30 ft. of row in cotton receiving different defoliation treatments applied to the bottom leaves of the plants. In trials where defoliants, including sodium chlorate + sodium pentaborate, sodium ethyl xanthate and monosodium cyanamide were applied, boll rot percentages averaged 22·2 for untreated and 6·6 for treated plants. The defoliants were applied 14 days before counts were taken. In other trials to study the effect of defoliation on the rate of boll opening, counts were taken on 5, 15 and 25 September, following defoliant treatment on 27 August. The number of open bolls on 5 September ranged from 21-33 for treated plants, and 5-15 for untreated plants. On 25 September open boll numbers ranged from 118-127 on treated and 81-84 on untreated plants. Most weeds and grasses on defoliated plots were killed or retarded in growth. The need for careful direction of the sprays to the bottom portions of the plants is stressed ; treatments should be given when the lower bolls are at least 35 days old. Dust defoliants are not recommended.—P.J.B.

575 PARDO, M. P. Comportamiento de variedades precoces de algodón en los regadíos del Ebro. [**Behaviour of early cotton varieties in the irrigated land of the Ebro.**] *Bol. Inst. Invest. agron.* 1953, **13,** No. 28, 71-97, illus., English summary p. 97. [Cent. Cuenca Cent. Ebro, Spain]
Trials have been carried out for the last few years to study the possibility of introducing cotton cultivation into the Ebro region. The varieties Chirpan and Esparta, grown under irrigation in 1950 (normal summer temperatures) and 1951 (low summer temperatures), appear perfectly adapted to this region.—E.B.O.

576 RICHARD, L. Essais d'amélioration de *Gossypium punctatum* au Soudan. [**Trials for improving *Gossypium punctatum* in the French Sudan.**] *Cot. et Fibr. trop.* 1953, **8,** No. 1, 149-59, illus. [Inst. Rech. Cot. Text. Exot.]
The cotton *G. punctatum* is grown by the natives of the Sudan-Haute Volta region, intercropped with sorghum, which is treated as the most important crop. The cotton develops mainly after the sorghum harvest. The yields are generally low and the short fibre produced is of little value. Attempts to replace *G. punctatum* with the variety N'Kourala, an Upland type, which is grown as a pure crop in some areas, were unsuccessful. The possibility of breeding a hybrid of *G. punctatum* and N'Kourala, with a longer fibre than the first-named, is under study.—E.B.O.

577 PATAL, G. B. and BHAT, N. R. **Strain 2087, a new wilt resistant cotton for the Surat tract.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 3, 230-2, illus.

The history of the selection of strains of cotton suitable for the Surat cotton tract, Bombay State, India, is outlined. An account is given of trials in 1949-51 in which the yield and quality of cotton obtained from the new strain 2087 were compared with that of 2 previously recommended strains, Suyog and 1027-A.L.F. Strain 2087 outyielded both Suyog and 1027-A.L.F. and gave a longer and finer fibre than Suyog. Strain 2087, which has the additional advantage over the other 2 varieties of being almost completely resistant to wilt (*Fusarium vasinfectum*), is now recommended for use in the entire Surat cotton tract.—W.J.B.

578 KHAN, A. H. and AFZAL, M. **Breeding of long staple varieties of cotton in the Punjab.** *Agriculture, Pakist.* 1951, **2,** No. 1-2, 55-60. [Cott. Res. Lab. Lyallpur, Pakist.]

Trials with long-staple cottons at Lyallpur and Multan are described. New varieties of special promise as regards yield, ginning percentage and length and strength of fibre are Lasani 5 and Lasani 13.—W.J.B.

579 SIMPSON, D. M. and DUNCAN, E. N. **Stability of cotton varieties.** *Agron. J.* 1953, **45,** No. 9, 448-50, bibl. 5. [Tennessee Agric. Exp. Sta., Knoxville]

Seed of 4 varieties of cotton was increased through 5 generations without either selection or roguing, though care was taken to prevent cross-pollination between varieties and admixture with other varieties at the ginnery. There were no significant changes in yield, boll weight, lint percentage, fibre-length uniformity, fibre strength or fineness, or immaturity ratio, over the 5-year period of multiplication. From these results, it was concluded that emphasis should be placed on preventing hybridization in the field, and seed admixture at the ginnery, as the major means for controlling the deterioration of varieties.—P.J.B.

580 SIMPSON, D. M. **Longevity of cottonseed.** *Agron. J.* 1953, **45,** No. 8, 391, bibl. 2. [Tennessee Agric. Exp. Sta., Knoxville]

A note is given on the germination of cotton seed stored for up to 15 years with moisture contents of 7, 9, 11, 13 and 14% and at controlled temperatures of 33°, 70° and 90° F. and at ordinary air temperatures. Seed stored at 33° F. and containing 7, 9, 11, 13 and 14% moisture had germination percentages of 91, 91, 93, 72 and nil, respectively, after 15 years. Seed stored for 15 yr. at 70° F. and with a moisture content of 7% had a germination percentage of 73 ; germination percentages of seed with moisture contents of over 7% were nil. Seed stored at 90° F. did not retain germinative powers for longer than 3 years, even at a moisture content of 7%. No seed stored at room temperatures retained viability for 15 years.—P.J.B.

581 HSI, D. C. H. and REEDER, H. M. **Dormancy of Upland and American-Egyptian cottonseed.** *Agron. J.* 1953, **45,** No. 9, 454, bibl. 1. [U.S. Dep. Agric. Fld Sta., Sacaton, Ariz.]

Comparisons were made of the germination of cotton seed collected from bolls up to 30 days after dehiscence, immediately after collection and after 2 months storage. Three Upland and 2 American-Egyptian varieties were used. The germination of seed collected up to 1 day after dehiscence was 63·7 and 91·3% for the Upland and American-Egyptian varieties tested immediately after collection ; similar tests made after 2 months' storage gave germination percentages of 77·6 and 92·5, respectively. These results showed that at least 13·9% of the seed of the Upland varieties was dormant when collected, while only 1·2% of the seed of the American-Egyptian varieties was dormant. Seed collected at 5-10 days after dehiscence showed respective dormancy values of 10·5 and 2% ; for seed collected 15-20 days after dehiscence, values were 8·3 and 1·7% and for seed collected 21-30 days after dehiscence, 0·7 and 1·6%, respectively. Fuzzy seed (i.e. with linters) was used in all cases.—P.J.B.

582 PONS, W. A. and others. **Gossypol in cottonseed. Influence of variety of cottonseed and environment.** *J. agric. Fd Chem.* 1953, **1,** No. 18, 1115-18, bibl. 16. [South. Reg. Res. Lab., New Orleans, La]

Eight varieties of cotton were grown at 13 locations in Arizona and California during 1947-9, to determine varietal differences in the gossypol content of cotton seed and the effect of environment on this characteristic. Mean gossypol contents in moisture-free cotton seed varied from 0·84% for Acala 4-42, to 1·32% for Rowden 41B ; for Stoneville 2B, Deltapine 15 and Coker 100W, values varied from 1·2 to 1·22% and for Acala 1517W and Mebane, from 1·14 to 1·15%. High temperatures during growth tended to produce low gossypol contents, while high rainfall increased it. From the data presented, it is suggested that varieties with a low gossypol content in the seed can be produced. —P.J.B.

583 DUFFIELD, P. C. and others. Enfermedades del algodonero en la Comarca Lagunera, México. [**Diseases of cotton in the Comarca Lagunera district, Northern Mexico.**] *Foll. Divulg. 12. Sec. Agric. Ganad., Mexico* 1953, pp. 42, English summary pp. 41-2.

The increase in the incidence of three diseases of cotton, damping-off disease (*Rhizoctonia* sp.)

Verticillium wilt (*Verticillium albo-atrum*) and Texas foot-rot (*Phymatotrichum omnivorum*), in the irrigated Comarca Lagunera district in recent years is attributed to continuous cropping with cotton. There is evidence that the use of cereals and Hubam sweet clover in rotations is the most effective means of reducing the incidence of these soil-borne diseases.—W.J.B.

584 JOOLOOR, C. S. and SAHASRABUDHE. **A note on grafting Egyptian cotton varieties.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 3, 189-91, bibl. 1, illus. [Inst. Pl. Industr. Indore, India]

Egyptian cotton (*Gossypium barbadense*) plants were successfully grafted on plants of a strain of *G. arboreum* resistant to jassids. One such grafted plant, now four years old, gives good yields of cotton which has a maximum lint length of about 42 mm. The grafted plant was unaffected by jassids. —W.J.B.

585 GIFFORD, E. M. **Effect of 2,4-D upon the development of the cotton leaf.** *Hilgardia* 1953, **21,** No. 18, 607-44, bibl. 34, illus.

A report is given of histological studies made to investigate the manner in which 2,4-D affects the vegetative development of cotton.—P.J.B.

586 MCILRATH, W. J. and ERGLE, D. R. **Developmental stages of the cotton plant as related to the effects of 2,4-D.** *Bot. Gaz.* 1953, **114,** No. 4, 461-7, bibl. 7, illus. [Texas A. and M. Coll., College Station]

Stoneville 2B cotton plants were treated, at the developmental stages of seedling, floral primordia, anthesis, and fruiting, with acid equivalent amounts of 0·01 mg. or 0·04 mg. of the sodium salt of 2,4-D. The earlier the developmental stage at the time of application, the more severely these amounts of 2,4-D affected the vegetative habit of the plants. At the seedling stage these quantities significantly inhibited main-stem height, number of main-stem nodes, and internodal length, but the number of vegetative laterals was greater. Application of 0·04 mg. at the floral-primordia stage also significantly inhibited main-stem height and stimulated the production of vegetative lateral branches. The degree of malformation of leaves on the main stem and on vegetative lateral branches was dependent upon the developmental stage of the plants at the time of 2,4-D application and upon the quantity of this substance applied. The same was true for malformation of flowers and bolls.—Authors' summary.

587 MCILRATH, W. J. and ERGLE, D. R. **Further evidence of persistence of the 2,4-D stimulus in cotton.** *Pl. Physiol.* 1953, **28,** No. 4, 693-702, bibl. 17, illus. [Texas A. and M. Coll., College Station]

Plants of Stoneville 28 and Marie Galante cotton grown in fertile soil, were sprayed with varying amounts of 2,4-D. Persistence of the 2,4-D stimulus was demonstrated in the vegetative organs of these varieties. The persistence was evidenced by the continued production by the plants of malformed main-stem leaves after treatment and by the number of malformed leaves produced. Persistence was further demonstrated by extraction of a growth-regulator from treated plants which induced cotton leaf malformation characteristic of 2,4-D.—From authors' summary.

588 EPPS, E. A. **Growth regulators. Effect of 2,4-D on growth and yield of cotton.** *J. agric. Fd Chem.* 1953, **1,** No. 16, 1009-10, bibl. 5. [Louisiana Agric. Exp. Sta., Baton Rouge]

Applications of 0·5, 0·2 and 0·05 lb. acid equivalent of 2,4-D ethanolamine salt per ac. were made to cotton on 17 May before fruiting ; in a second series of treatments, 0·2, 0·05 and 0·01 lb. 2,4-D per ac. were applied after fruiting on 21 June. Five weeks after the treatment on 17 May, all plants receiving 0·5 lb. 2,4-D per ac. were dead ; those receiving 0·2 lb. per ac. survived, but made little growth, while those receiving 0·05 lb. per ac. had produced vigorous side branches ; respective yields of seed cotton were nil, nil and 23 lb. per ac. Following treatment on 21 June, seed cotton yields of plants receiving 0·2, 0·05 and 0·01 lb. 2,4-D per ac. were 132, 292 and 565 lb. per ac. Untreated controls yielded 875 lb. seed cotton per ac. From these results, it is concluded that the application of rates in excess of 0·01 lb. 2,4-D acid per ac. at any time, except when bolls are almost mature, will severely reduce seed cotton yields. Much of the injury to cotton in Louisiana caused by 2,4-D spray-drift has resulted from amounts of this order. —P.J.B.

589 SUBRAMANIAN, V. K. **Drought resistance of cotton.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 4, 279-82, bibl. 2. [Agric. Met. Div., Poona]

Details are given of a method of testing the resistance of cotton varieties to aerial drought. For each variety tested, the behaviour of plants grown in arid and humid air conditions was recorded. The decrease in relative transpiration (the ratio of transpiration to evaporation) of each variety under arid, compared with humid, air conditions was taken as a measure of drought resistance.—W.J.B.

590 NAYAK, H. R. **Response of fibre properties and agronomic characters of cotton to different doses of farmyard manure.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 4, 292-6, bibl. 6. [Cott. Res. Lab. Nanded]

The influence of various rates of manuring with farmyard manure and groundnut cake on the yield of seed cotton per ac., 100-seed weight, lint index, ginning percentage, mean fibre-weight per inch and mean fibre-length of Jaywant cotton was investigated in experiments in 1945-8. None of the manurial treatments (which included a no-manure control) had any significant effect on the fibre properties and agronomic characters studied. The effect of the year of sowing on all the properties studied, except ginning percentage, was highly significant.—W.J.B.

591 NAYAR, K. V. N. **A prediction formula for estimating the spinning value (H.S.W.C.) of American cottons grown in Malwa from their fibre properties.** *Indian Cott. Gr. Rev.* 1953, **7,** No. 4, 283-8, bibl. 4, illus. [Inst Pl. Industr. Indore]

## FLAX

592 BAGGE, H. and LARSEN, A. Forsøg med såmengder af spindhør 1946-1951. [**Sowing-rate trials with flax 1946-1951.**] *Tidsskr. Planteavl* 1953, **56,** No. 4, 545-80, English summary pp. 575-6.

The trials were carried out at 4 locations in Denmark with the flax varieties Stormont Cirrus and Concurrent. Sowing rates for Stormont Cirrus were 100, 130, and 160 kg. per ha. and for Concurrent, 110, 140 and 170 kg. per ha. The seeds were sown in rows 15 cm. apart. The flax was processed either by green scutching or after retting. At Lyngby and Aarslev, on clay-loam soils, sowing rates of 130 and 160 kg. per ha. for Stormont Cirrus gave straw yields 270 and 360 kg. per ha., respectively, above those where 100 kg. per ha. sowing rates were used ; respective seed yields were 35 and 75 kg. lower, long-fibre yields were 33 and 77 kg. above and tow yields were 118 and 215 kg. per ha. above those where 100 kg. per ha. sowing rates were used, while estimated profits in kroner per ha. were increased by 91 and 239, respectively. These data were from fibre scutched green ; where preparatory retting was carried out, returns were +29 and —46 kroner per ha., respectively. With Concurrent, sowing rates of 140 and 170 kg. per ha. resulted in straw yields 190 and 310 kg. per ha. above those where 100 kg. per ha. sowing rates were used ; respective seed yields were reduced by 50 and 75 kg., long-fibre yields were increased by 49 and 13 and tow yields increased by 55 and 165 kg. per ha., while returns in kroner per ha. were +102 and —47. These data refer to green scutched fibre ; where preliminary retting was carried out, increasing the sowing rates to 140 and 170 kg. resulted in losses of 89 and 77 kroner per ha., respectively. In the case of trials at Blangstedgaard, on heavy clay-loam with good water-retaining capacity, increasing the sowing rates in the case of both varieties in almost all cases resulted in smaller yields of straw, long fibre and tow, and, in all but one case, in considerable economic losses. From these results, it is concluded that relatively lower sowing rates should be used where retting is done, compared with where the fibre is scutched green. The lack of increase in fibre yield at Blangstedgaard in the case of Stormont Cirrus appeared to be largely due to the excellent stands obtained at the 100 kg. per ha. sowing rate. Optimum sowing rates appeared to be those giving plant populations of slightly over 2000 plants per sq. m. for Stormont Cirrus and slightly under this figure for Concurrent. In all but those parts of Denmark with the highest rainfall, sowing rates of 160 kg. for Stormont Cirrus and 140 kg. per ha. for Concurrent were optimum where the fibre was scutched green and soils were light to heavy clay-loam ; on heavy soils in damp regions, respective optimum sowing rates appeared to be 125-130 kg. for both varieties.—P.J.B.

593 WILLEY, L. A. **Flax variety trials, 1950-52. Pt. 1. Field results.**
COX, E. G. and SAMUELS, D. E. J. **Flax variety trials, 1950-52. Pt. 2. Combined processing results.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 475-80, 480-8, respectively. [NIAB (L.A.W.) ; H.M. Norfolk Flax Establ. (E.G.C. and D.E.J.S.)]

Field trials of the flax varieties Hollandia, Percello, and Stormont Motley, with Liral Prince as control, were sown in Kent, Norfolk, Northants., Yorkshire and the south-west, in each of the 3 years, 1950-2. Each trial was of randomized-block design, with 6 replications and a harvest plot-size of 1/32nd acre. Details are given of the management of the trials and the field behaviour of the varieties. The produce of each trial was despatched to H.M. Flax Establishment where the material was processed under uniform conditions. The account of this processing includes the yield of crop, the percentage of scrutched flax on de-seeded straw, yield of scrutched flax, and yield of seed as a percentage of crop weight. Percello gave the best all-round performance, being markedly superior to Liral Prince in resistance to lodging and slightly superior in yield of crop and fibre.—From summary.

594 MARCIOTTE, C. V. Influencia del estado de madurez industrial sobre el rendimiento del lino textil. [**Influence of the stage of maturity of flax at harvest-time on the yield of fibre.**] *Rev. Invest. agric.* 1953, **7,** No. 1, 81-96, bibl. 4.

595 WALCZYK, F. Versuche mit chemischen Unkrautbekämpfungsmitteln bei Flachs.

[**Experimental control of weeds in flax, using chemical herbicides.**] *Z. Acker- u. Pflbau* 1953, **97,** No. 2. 231-4, bibl. 2. [Inst. Bastfaserforsch., Niedermarsberg, Germany]
The flax plant is liable to injury from chemical weedkillers. Trials were made in 1951 and 1952 to compare the effects on fibre flax of two caustic weedkillers and of growth-substance preparations based upon 2,4-D and MCPA, respectively. Dutch findings that the best time of application is when the flax is 8-12 cm. high and the weather is dry and warm were confirmed [see Friederich, *Fld Crop Abstr.* 5 : 1012 and 6 : 829]. The caustic agents, especially Raphatox applied early, did not significantly reduce yield and long-fibre content, but long-fibre content was reduced approximately twice as much by the growth substance preparations. No clear difference in fibre quality was observed. The use of weedkillers enables yield to be increased through a closer spacing of drills, but growth-substance preparations should be employed only when the presence of root weeds renders caustic agents inadequate for control.—G.M.R.

596 Millikan, C. R. **Diseases of flax and linseed.** *Tech. Bull. 9. Dep. Agric. Vict. Biol. Branch* 1951, pp. 140, bibl. 270 in text.

### HEMP

597 Haarer, A. E. **Hemp (*Cannabis sativa*).** *World Crops* 1953, **5,** No. 11, 445-8, bibl. 5, illus.
A review is given of available knowledge on the growing and processing of hemp, the reasons for the crop's decline in favour in the past and the possibilities of its extended cultivation in the future. Mechanical harvesting and processing of hemp in the USA are described. The swaths are cut by machine and dew-retted in the field. They are afterwards turned by machine and the retted stems scutched mechanically. Methods of sowing hemp in the USA are described. In general, in order to produce the best fibre, 3-4 bu. per ac. of seed are sown to give stems 5-8 ft. tall with diameters of about 0·375 in. The average yield of hemp per ac., 0·5-0·75 tons yielding 700-1000 lb. spinnable fibre, is low compared with that of many other fibre-yielding plants.—W.J.B.

598 Illičevskiĭ, S. [**Wild hemp in the lower Dnieper area.**] [Russian] *Bot. Ž. SSSR* (*Bot. J. USSR*) 1953, **38,** No. 2, 251-2, bibl. 8.
In *The Flora of USSR* (Vol. 5, p. 384) *Cannabis ruderalis* is recorded as occurring in the central and southern Volga area, western Siberia and Central Asia. The author states that the Kherson Province is another centre from which this species is disseminated, and that it is a valuable fibre plant for southern areas in the USSR as it flourishes on sands of the dry steppe where the annual precipitation is only 250-350 mm. It is of doubtful value as an oil crop because of its uneven ripening and seed shedding.—M.H.

### JUTE

599 Ghosh, T. and others. **Effect of insolation and chemical treatment in relation to storing of jute seeds.** *Indian Phytopath.* 1951, **4,** No. 1, 38-44, bibl. 2. [Jute Agric. Res. Inst. Hooghly, West Bengal]
Both *Corchorus capsularis* and *C. olitorius* suffer from stem rot caused by *Macrophomina phaseoli*. To prevent the disease, all seed should be dried for 4 days or more before storage and then treated with organic mercury compounds. Seeds thus treated can be kept for 14 months, or more, without loss to viability, provided that they are kept in airtight, moisture-free containers.—W.J.B.

### OTHER

600 Lejeune, J. B. H. Contribution à l'étude des plantes à fibres, à Rubona. [**A contribution to the study of fibre plants, at Rubona.**] *Bull. agric. Congo belge* 1953, **44,** No. 4, 743-72, illus. [Sta. Exp. INÉAC, Rubona, Ruanda]
The value as fibre crops of several plants, including both cultivated and wild species, was investigated. Among those which gave promising results were : strains 026, 071, 0125 and 020 of *Urena lobata* ; *Hibiscus* spp., including *H. eetveldeanus* var. *rubra* ; *Sida cordifolia* and *Sida* sp. var. Umucundura ; *Abutilon mauritianum* and *A. angularis* ; and *Crotalaria juncea*.—E.B.O.

## OIL CROPS

### LINSEED

601 Manner, R. Hammenhögs Indus oljelin. Ny sort för södra Götalands slättbygder. [**Hammenhög's Indus linseed. New variety for the plains of south Götaland.**] *Hammenhög's Ann. Cat.* 1954, Spring, 1819.
Indus was selected from Øtofte. In trials in 4 regions of Sweden during 1952-3, Indus outyielded Valuta, Svalöf's Pure Line II, Adoptiv and Vaanila by not less than 4%.—P.J.B.

602 Culbertson, J. O. **Registration of flax [linseed] varieties 6.** *Agron. J.* 1953, **45,** No. 7, 317-18.

Marine (C.I. 1135, Reg. No. 12) was developed from a cross C.I. 975 × Sheyenne, and has good resistance to wilt (*Fusarium oxysporum lini*), pasmo (*Mycosphaerella linorum*) and the known N. American races of flax rust (*Melampsora lini*). In trials at 6 locations in north-central USA, Marine has yielded well, even where sown early. Where sown in June, Marine has outyielded most later-maturing varieties. In 3 years' trials in Minnesota at 7 locations, Marine outyielded Sheyenne and Bison at 6 locations and was outyielded by B5128 and Redwood when sown early. Marine appeared to be preferable to B5128 and Redwood when sown late. Marine is regarded as suitable for those parts of north-central USA where disease or drought may be a problem. It is suited to dry areas of N. and S. Dakota and, where sowing is delayed, in N. and S. Dakota or Minnesota.—P.J.B.

603 ARGENTINA. Pergamino Experimental Station "Pergamino Pampa M.A.G." Nueva variedad de lino oleaginoso. [**A new variety of linseed, Pergamino Pampa M.A.G.**] *Idia* 1953, No. 69, 19-20.

The yields obtained from the new variety Pergamino Pampa M.A.G., in trials lasting 7 years, were higher than those from any other variety. Its oil content, 40·3%, and iodine index, 178, were slightly lower than those of Charrúa M.A.G. The latter variety also has greater resistance to marchitamiento [wilt caused by *Fusarium lini*] than Pergamino Pampa M.A.G.—W.J.B.

604 CRUICKSHANK, I. A. M. **Thermo-chemical seed treatment.** *Nature, Lond.* 1954, **173,** No. 4396, 217-18, bibl. 4.

Experiments were made to determine the effect of steeping in carbon tetrachloride on germination and on control of seed-borne pasmo (*Sphaerella linorum*) in two varieties of *Linum usitatissimum*, namely, Golden Viking and Koto. The use of carbon tetrachloride instead of water as a material for heat treatment of linseed has advantages in that the safety limits with regard to germination are wider and no artificial drying of seed is necessary ; but a specially designed steep is necessary. Under conditions of the test, in which 36 temperature/time combinations were studied, there was a significant depression of germination only at 70° and 75° C. for 30 min. with Golden Viking and under the same temperatures for 20 min. with Koto.—M.H.

605 JACOBSON, G. Ogräsbekämpning i oljelin. Preliminära resultat från de av Statens Jordbruksförsök i samarbete med Sveriges Oljeväxtodlares Centralförening ledda ogräsbekämpningsförsöken i oljelin åren 1948-1952. [**Weed control in linseed. Preliminary results of weed control trials in linseed conducted by the State Agricultural Research Organization in co-operation with the Swedish Oil Seed Producers Association during 1948-1952.**] *Forhåndsmedd. 72. Stat. Jordbruksförsök.* 1953, pp. 34, English summary.

A report is given of trials in which a copper preparation, DNOC, MCPA, 2,4-D, DNOSBP and mixtures of MCPA + DNOC and MCPA + 2,4-D were used. Best results were secured where the linseed was sprayed when not more than 5-8 cm. high. In terms of linseed yields and weed control, application of 5 l. MCPA preparation per ha. gave the best results. Equally high yields were obtained where DNOC, alone, was used, but weed control was variable, though it gave better control of *Galeopsis* sp., *Fumaria officinalis*, *Polygonum* sp. and *Spergula arvensis* than MCPA in most cases. In the relatively dry parts of eastern Sweden, DNOC and mixtures of DNOC + MCPA gave somewhat better results than MPCA used alone, except where *Sonchus arvensis* was prevalent, or the temperature was below 10°C. In terms of linseed yields, 2,4-D gave relatively poor results. No herbicide had any apparent effect on oil yield, crude-protein yield, or on germination of the seed except in the case of 2,4-D, which reduced germination.—P.J.B.

606 KNOWLES, P. F. and HOUSTON, B. R. **Resistance of flax [linseed] varieties to Fusarium wilt.** *Agron. J.* 1953, **45,** No. 9, 408-14, bibl. 17. [Univ. California, Davis]

Of 222 linseed varieties tested, 15 from USA, 3 from Argentina and one from Portugal were resistant to *Fusarium oxysporum* var. *lini*. No varieties originating from southwest Asia, India, or North Africa were highly resistant.—P.J.B.

## RAPE

607 HÖRBERG, Y. Weibulls Margo. Ny höstraps. [**Weibull's Margo. A new winter rape variety.**] *Weibull's Arsb.* 1953, Autumn, 11, illus.

A note is given on Margo winter rape [*Brassica napus* var. *oleifera* subvar. *biennis*], a variety selected for winterhardiness from Matador. In 3-years' winter-hardiness trials in Sweden, overwintering values for Lembke, Matador, Regal and Margo were 3·2, 3·3, 3·2 and 4·3, respectively. In 2-years' trials at Weibullsholm, Margo gave average yields of 4575 kg. seed per ha., which was 5% more than Lembke or Matador. Official trials with Margo have not continued long enough to give a clear picture of its capabilities, but results so far indicate that it has good winter-hardiness and is stiff-strawed.—P.J.B.

608 MANNER, R. Hammenhögs höstrapsförädlingar i skånska försök 1950-1953.

[**Hammenhog's winter rape strains in Scanian trials during 1950-53.**] *Hammenhög's Ann. Cat.* 1954, Spring, 13-17, illus.

Regal winter rape [*Brassica napus* var. *oleifera* subvar. *biennis*] was placed on the market in Sweden in 1951. In trials at Gullåker during 1950-3, mean relative yields of Regal, Lembke, Matador and Plus (over 3 years, only) were 100, 93, 95 and 102, respectively. In trials in Skåne during 1950-3, Regal outyielded Lembke, Matador A, Matador B, Tenus, Margo and Scherwitz by 1, 1, 10, 1 and 12%, respectively. The new variety, Plus, appears to be slightly superior to Regal, though only short trials with this variety have so far been conducted.—P.J.B.

## OTHER

609 VACHHANI, M. V. **The influence of sowing dates on the yield of oleiferous brassicae crops.** *Indian J. agric. Sci.* 1952, **22,** Pt. 4, 397-404, bibl. 3, illus.

The oil-seed crops toria (*Brassica campestris* var. toria), sarson (*B. campestris* var. sarson), rai (*B. juncea*) and taramira (*Eruca sativa*) which are grown as winter crops in Northern India and occupy about 6 million ac. annually, are briefly described. Experiments were carried out in 1943-4 and 1945-6 to determine the effect on yield of a range of sowing dates varying from the end of September to early December. The yields of all 4 crops decreased as sowing dates were delayed, the decrease becoming more rapid after early November. Rai and toria gave significantly higher yields than sarson and taramira. At all sowing dates rai gave a higher mean yield than any other type of oil-seed crop tested, the difference being especially pronounced on late-sown plots.—W.J.B.

# LAND USE, SURVEYS AND MANAGEMENT

610† TJURIN, I. V. [**Measures for increasing harvests and further development of agriculture in the non-chernozem belt of USSR.**] [Russian] *Priroda, Moskva* (*Nature, Moscow*) 1953, **42,** No. 12, 3-12, bibl. in text, illus.

This popular account of the agronomical measures undertaken includes maps on which are indicated: (1) the zones of the different vegetation types in the European part of the USSR; (2) the amounts of annual precipitation; (3) number of days in the year with average daily temperatures above 5°C.; (4) January and July isotherms.—M.H.

611 BUCHANAN, K. **The distribution of systems of farming in Britain.** [n.d.], pp. 12, illus. [Ass. Agric.]

This brochure serves as an introduction to, and comprises a detailed description of, the categories of farming systems as delineated on a coloured wall map of Great Britain. The map has been designed for use in schoolrooms and young farmers' clubs and is produced by Newman Neame Maps, Ltd. for the Association of Agriculture and the National Federation of Young Farmers' Clubs and is priced at 7s. 6d.—M.A.

612† ROBINSON, D. A. **Land use planning in native reserves in Southern Rhodesia.** *Rhod. agric. J.* 1953, **50,** No. 4, 327-33, bibl. 7.

An account of native farming practice and of the problems of shifting cultivation in the Colony is given. The use of a 'population land factor' to assess the human and stock-carrying capacity of the reserves is suggested. The present system of land classification in reserves in the Colony is described. The basic land use plan and the Reserve plan are outlined.—M.A.

613 TISSERANT, R. P. C. L'agriculture dans les savanes de l'Oubangui. [**Agriculture in the savannah of Ubangi (French Equatorial Africa).**] *Bull. Inst. centrafr.* 1953, No. 6, 209-73.

Information is given on the agriculture of this region before the arrival of the white man, and its subsequent development.—E.B.O.

614† TROCHAIN, J. Les territories phytogéographiques de l'Afrique Noire Française d'après leur pluviométrie. [**The phytogeographic regions of French West Africa in relation to rainfall.**] *Bot. Ser. 5. Rec. lab. bot. geol. zool. Montpellier* 1952, 113-24, bibl. 7, illus.

615† MOTA, F. S. da. Divisão Agroclimatica do Brasil meridional [**The division of Southern Brazil into agroclimatic districts.**] *Bol. tec. 7. Inst. Agron. do Sul, Pelotas, Rio Grande do Sul* 1953, pp. 18, bibl. 31, illus., English summary p. 16.

The three southern States of Brazil, Paraná, Santa Catarina and Rio Grande do Sul, are divided into 108 agroclimatic districts using da Fina's method. [See *Fld Crop Abstr.* 5 : 543 and 6 : 738.] Maps are provided by means of which the agroclimatic characters of the various administrative districts can be established.—W.J.B.

616 SCOTT, J. D. **A contribution to the study of the problems of the Drakensberg Conservation Area.** *Sci. Bull. 324* (*Sci. Ser. 2.*) *Natal Res. Inst. Dep. Agric. S. Afr.* [n.d.], pp. 170, bibl. 64, illus.

A description of the Drakensberg Conservation

Area includes notes on climate, vegetation, soils and farming practices. A survey of the main problems affecting the 4 main land-use types: the thorn veld, the tall-grass veld, the highland sourveld and the irrigated areas, is followed by a review of the methods employed in the improvement of these areas. The results of numerous veld management experiments are given which included investigations into scrub eradication, grazing, management trials, anti-erosion works, fodder conservation methods, irrigation practices and the effects of veld burning. The effect of this research on farming in the area is discussed and a review of the application of the results to farming systems is given.—M.A.

617 AUSTRALIA. Commonwealth Scientific and Industrial Research Organization. **Survey of Katherine-Darwin region, 1946. Extracts from general report.** *Land Res. Ser. 1. CSIRO* 1952 pp. 24, illus. [Received 1953] [Melbourne]

This summary of the general report on a survey of the Katherine-Darwin region in 1946 contains a description of the area and its agricultural industries. Reasons are given for the present lack of development. Areas suitable for future agricultural development are described.—M.A.

618† AUSTRALIA. Commonwealth Scientific and Industrial Research Organization. **Survey of Townsville-Bowen region 1950.** *Land Res. Ser. 2. CSIRO* 1953, pp. 87, illus. [Melbourne] [Received 1953]

The object of this survey, undertaken in 1950, was to describe and map the inherent land characteristics of the region and to report on the possibilities of land use, including those related to irrigation proposals put forward in connexion with damming the Burdekin River on the east coast of Queensland. A description of the soils, vegetation and the present land systems of the region, is given. The potentialities of the land-use groups of the region are considered.—M.A.

619† AUSTRALIA. Commonwealth Scientific and Industrial Research Organization. **Survey of Barkly region, 1947-8. Extracts from report.** *Land Res. Ser. 3, CSIRO* 1952. pp. 55, illus. [Melbourne] [Received 1953].

A field survey of the Barkly region of the Northern Territory and Queensland was conducted in 1947 and 1948. The survey had as its objective, the description and mapping of the country including its geology, topography, soils and vegetation and the broad division of the region into land-use groups. The agricultural and pastoral potentialities of the region are summarized and these are discussed in relation to the future development of the area.—M.A.

620 JOHNSTON, W. B. **Pacific island agriculture: the contemporary position in Western Samoa and some wider implications.** *Econ. Geogr.* 1953, **29,** No. 1, 26-38, bibl. 10, illus.

The effect on the agricultural pattern of life in Western Samoa brought about by an increase in population and by its concentration in the neighbourhood of the capital, Apia, is discussed. The expansion of native agriculture and the familiar features of land exploitation and soil erosion are described in relation to the general commercial and political tendencies affecting the islands' economy. —M.A.

621† NUTTONSON, M. Y. **Ecological crop geography and field practices of the Ryukyu Islands, natural vegetation of the Ryukyus, and agro-climatic analogues in the Northern Hemisphere.** *Publ. Amer. Inst. Crop Ecol.* 1952, pp. 106, bibl. 35.

622† ALLRED, E. R. and CHEN, R. **Evaluating irrigation needs in humid areas.** *Agric. Engng, St. Joseph, Mich.* 1953, **34,** No. 9, 611-15 and 619, bibl. 19 [Univ. Minnesota]

Methods of evaluating irrigation needs are divided into 3 operations, thus: (a) analysis of existing climatological data, so that a theoretical estimate of annual water deficiency can be made, (b) observation of the results of field irrigation trials which accurately measure irrigation requirements, and (c) correcting theoretical estimates for given years to give results approximating to actual irrigation needs, as indicated by field trials. Examples, using data obtained from the Minneapolis region, are given of the manner of carrying out the 3 operations. The use of the IBM card system for analysing climatological data, is described.—P.J.B.

623 BLAGBURN, C. H. **Measuring business efficiency on the farm.** *Agriculture, Lond.* 1954, **60,** No. 11, 508-12. [Dep. Agric. Econ. Reading Univ.]

A brief account is given of a simple system of economic analysis intended to provide advisory officers with a means of guiding farmers towards more profitable management. The degree of intensity of the enterprise studied and the level of yields are compared with those of "normal" enterprises. The degree of intensity is found to be positively correlated with profitability in the case of many types of enterprise. The level of yields is taken to reflect efficiency of technique. Methods of locating flaws in both organization and technique are discussed. Sturrock's "work-unit" system, whereby labour requirements per acre of crop or per head of stock are compared with suitable norms, is quoted as an example of a simple method of estimating labour efficiency.—W.J.B.

624 ENGLEDOW, F. **Agricultural policy in colonial territories. An address delivered to the Colonial Office Conference of Directors of Agriculture at Wye [Kent], 9th September, 1953.** *Trop. Agric.* 1954, **31,** No. 1, 3-10.

Sir Frank Engledow briefly reviewed the underlying principles of agricultural policy as illustrated by historical examples. It was necessary for governments to come to firm decisions on agricultural policy after weighing the not necessarily compatible claims of national economy, strategy, social welfare and the agricultural and nutritional sciences. In the formulation of colonial agricultural policies, attention to sociological considerations was important. The contribution of the agriculturalist to such policies should be the result of intensive studies of: (a) environment (agro-climatic) regions, (b) soil and water conservation and (c) farming systems. Colonial administrations should give clear definitions of agricultural policy for the guidance and inspiration of the technical departments concerned.—W.J.B.

## SOIL AND WATER CONSERVATION

625† DARLEY, E. C. **Crop rotations for soil conservation in the Lockyer Valley.** *Qd agric. J.* 1953. **77,** Pt. 4, 187-96, illus.

The existing farming rotations and crops grown on the upland non-irrigated soils of the slopes and on the irrigable plain soils in the Lockyer Valley area of south-eastern Queensland are described. The adoption of modified rotations including fodder conservation, rotational grazing and adjustment of stocking rates are recommended as necessary steps in the reconditioning of areas subject to erosion.—M.A.

626† RIVISTA DI AGRICOLTURA SUBTROPICALE E TROPICALE. Attività di bonifica in Italia. [**Land reclamation in Italy.**] *Riv. Agric. subtrop.* 1953, **47,** No. 10-12, 431-7.

In this report by the Italian government, an outline is presented of the land reclamation and irrigation works carried out in various regions of Italy and of the resultant economic improvements.—E.B.O.

627 BEEKOM, C. W. C. **Reclaiming land flooded with salt water.** *Neth. J. agric. Sci.* 1953, **1,** No. 4, 225-44, illus.

Recommendations for the cultivation of crops on land damaged by flooding with sea-water are made on the basis of experience in the Netherlands. The amounts of gypsum (calcium sulphate) which must be applied to soils of varying clay content and salt (sodium chloride) concentration, in order to restore the damaged soil-structure, are tabulated. In the first year after serious flooding, no deep cultivations should be attempted. Spring barley may produce a fair crop under specially favourable weather conditions. Part of the land should be sown with winter cereals after shallow autumn cultivations. In the second year after flooding, a shallow, rather rough seed-bed should be prepared and immediately sown with spring crops, among which spring cereals are best suited to the seed-bed conditions. In general sugar- and fodder-beet are unsuitable for a shallow seed-bed, and, in addition, cannot be lifted from the wet soil in the autumn without difficulty and damage to the soil-structure. To avoid overcropping with cereals, fields with soil conditions above the average for the farm (for example, fields with light soils or those under grass when flooded) should be selected for sowing with flax, beets, or, at a low salt-content, potatoes. [See Abs. 254 for an account of the salt-tolerance of various crops.] Herbage crops are also recommended as an alternative to cereals. Where a fine seed-bed is required, the application of an extra 1 ton of gypsum per ha. is recommended to prevent crust-formation. Potatoes should be planted high in the ridge in saline soils to avoid rotting. Shallow ploughing of the soil may take place for the first time in the autumn of the second year after flooding. The gypsum dressing is usually applied in two halves: the first half in the autumn following the flooding and the second half, after ploughing, in the second autumn after the flooding.—W.J.B.

## WEEDS AND WEED CONTROL

(*See also under individual crops.*)

28 SPEIR, W. H. and STEPHENS, J. C. **Herbicidal tests for control of Para grass on ditch banks in the Everglades region of Florida.** *Weeds* 1953, **2,** No. 1, 15-23, bibl. 6. [Florida Agric. Exp. Sta., Gainesville]

Different rates of treatment and combinations of the Na and Ca salts and the isopropyl ester of TCA, Polybor-Chlorate 88 and CMU were applied to Para grass (*Panicum barbinode*). Observations made 1 year after treatment showed that where either one application of 80 lb. CMU per ac., or repeated applications of other herbicides were made, regrowth of Para grass was prevented. Pre-treatment of Para grass by flaming, or by contact herbicides, rendered the weed more susceptible to relatively low rates of application of TCA, Polybor-Chlorate, or CMU applied 3-6 weeks later, compared with where no pre-treatment was carried out.—P.J.B.

629 Hoffman, O. L. and Sylwester, E. P. **Comments: on quack grass control with maleic hydrazide.** *Weeds* 1953, **2,** No. 1, 66-7, bibl. 5.

Applications of 4 and 8 lb. maleic hydrazide per ac., followed by spading-over the soil, resulted in 83 and 95% control of *Agropyron repens*, respectively. Top-killing *A. repens* by contact herbicides after treatment with maleic hydrazide did not increase its effectiveness. It is considered that applications of 8 lb. maleic hydrazide per ac., made at least 2 days before ploughing soil infested with *A. repens* may give adequate control of this weed.—P.J.B.

630 Eggler, W. A. **The use of 2,4-D in the control of water hyacinth and alligator weed in the Mississippi delta, with certain ecological implications.** *Ecology* 1953, **34,** No. 2, 409-14, bibl. 3. [Biol. Dep., Newcomb Coll., Tulane Univ., New Orleans, La]

Applications of 1-16 lb. 2,4-D amine, mainly from a helicopter, were used in S. Louisiana to control water hyacinth (*Eichhornia crassipes*) and alligator weed (*Alternanthera philoxeroides*) growing in different habitats. Eight lb. 2,4-D per ac., applied in late summer or autumn when growth was slow, controlled *E. crassipes*; follow-up treatments were necessary to give complete control. *A. philoxeroides* was not so effectively controlled by 2,4-D as was *E. crassipes*. Applications of 8 lb. 2,4-D per ac. considerably reduced *A. philoxeroides* stands, but it could not be determined how many follow-up treatments were needed to eradicate this weed. Observations are given on the effect of these treatments on other aquatic plants.—P.J.B.

631 Sauer, J. A. **A geography of pokeweed.** *Ann. Mo. bot. Gdn* 1952, **39,** No. 2, 113-25, bibl. 28, illus. [Received 1953] [Henry Shaw Bot. Sch., Univ. Washington]

This paper attempts to describe and understand the distribution of *Phytolacca decandra* in the USA.—P.J.B.

632† Hosaka, E. Y. **Sour grass in Hawaii.** *Ext. Circ. 336. Hawaii agric. Exp Sta.* 1953, pp. 2, illus.

A note is given on *Trichachne insularis*, which has become an important weed of arable and pasture land in Hawaii. Recommendations for controlling the weed include the grubbing-up of individual plants and small patches of plants. Guinea grass (*Panicum maximum*) can sometimes crowd it out by virtue of its superior tolerance to shade.—P.J.B.

633 Muzik, T. J. and Cruzado, H. J. **The effect of 2,4-D on sprout formation in *Cyperus rotundus*.** *Amer. J. Bot.* 1953, **40,** No. 7, 507-11, bibl. 13. [Fed.; Exp. Sta. Mayaguez, Puerto Rico]

In nutgrass (*Cyperus rotundus*) the apical bud inhibited sprouting in the other buds on the same tuber, and the top tuber exerted a similar dominance over the lower tubers in the system. Dominance in the system is weaker than dominance in the tuber and may be overcome by inverting the system or aligning it horizontally. New tubers are formed within 3 weeks after planting. Growth is entirely from preformed buds. Tubers separated from the chain or in chains with heat-killed rhizomes sprouted at equal rates. Light stimulated sprouting. It is suggested that a method of control of this weed pest should consist of methods designed to disturb the underground system as much as possible to induce maximum sprouting before treatment with 2,4-D or some other systemic herbicide.—Authors' summary.

634 Day, B. E. **Soil fumigation with chlorobromopropene for the control of nutgrass.** *Hilgardia* 1953, **21,** No. 18, 593-604, bibl. 25, illus.

A report is given of preliminary experiments on the control of localized patches of *Cyperus rotundus* by the use of soil fumigation with a commercial formulation of chlorinated $C_3$ hydrocarbons containing about 55% of 1,-3-chloro-3 bromopropene (CBP). In laboratory trials, concentrations of 0·04 ml. CBP per l. of confined space in fumigation flasks containing vermiculite or soil, gave a complete kill of *C. rotundus* tubers and plants after treatment for 5 hr. The effectiveness of CBP was not greatly affected by temperature, but was limited where the soil moisture was at field capacity. In field trials, 80 gal. per ac. of CBP injected into the soil in rows 6-12 in. apart on moderately dry, well-tilled soil gave good control of *C. rotundus*; on light, well-tilled soil, 160 gal. CBP per ac. were needed. No soil covering, e.g. tarpaulins, was required.—P.J.B.

635 Villar, A. D. and Arroyo, P. A. Destrucción del "yuyo sapo" mediante ésteres del 2,4-D y labores superficiales. [**Destruction of the weed *Wedelia glauca* using 2,4-D esters and surface cultivations.**] *Idia* 1953, No. 70, 15-16, illus. [Oliveros Exp. Sta., Argentina]

As a result of experiments carried out in 1949-52, recommendations are given for the destruction of the perennial rhizomatous weed, *Wedelia glauca*. On land infested with the weed, wheat should be sown early (in May) and harvested in mid-November. The stubble should be harrowed after the harvest and in January the land should be treated with 2,4-D ester at the rate of 640 g. acid equivalent per ha. to control *W. glauca* at the preflowering stage. A further harrowing in February is followed by treatment of the weed with 2,4-D in March. A crop of barley, rye or oats is then grown during April-November. If, after harrowing the stubble of the second cereal crop, isolated plants of *W. glauca* appear, the weeds should be sprayed again with 2,4-D.—W.J.B.

636 † JOURNAL OF THE DEPARTMENT OF AGRICULTURE OF WEST AUSTRALIA. **Khaki weed (*Alternanthera pungens H.B.K.*). A new noxious weed recorded at Bunbury**. *J. Dep. Agric. W. Aust.* 1953, **2,** No. 4, 543, illus.

Khaki weed has now been discovered at Bunbury, Western Australia. A description of the plant and of its growth habit is given, as well as measures for its control in arable land and pastures.—M.A.

637 VON HOFSTEN, C. G. Gullkragen—ett dödsdömt ogräs. [**Corn marigold—a doomed weed.**] *Lantm. Svenskt Land* 1953, **37,** No. 43, 910-12, illus.

Notes are given on the control of *Chrysanthemum segetum*, a serious weed of annual crops in southwest Sweden. Sevtox (DNBP formulation) has, so far, been the only herbicide that has successfully controlled this weed in Sweden. In cereal crops, good results have been obtained where applications of either 4·5-5·01. Sevtox in 450 l. water per ha., or a mixture of 4 l. Sevtox + 5 l. MCPA standard formulation in 450 l. water per ha. were made when the weed was 5-10 cm. high.—P.J.B.

638 † BEIJERINK, N. **On the habit, ecology and taxonomy of the brambles of the Netherlands.** *Acta Bot. Neer.* 1953, **1,** No. 4, 523-45, bibl. 38, illus. [Biol. Sta., Wijster, Neth.]

639 † CRESCINI, F. and SPREAFICO, L. Piante coltivate contro erbe infestanti. 1. Ricerche intorno alla biologia della germinazione degli acheni dell'*Artemisia vulgaris* L. [**Cultivated plants versus weeds. 1. Investigations into the biology of germination of the achenes of *Artemisia vulgaris* L.**] *Ann. Sper. agr.* 1953, **7,** No. 5, 1597-610, bibl. in text, illus., English summary p. 1610. [Ist. Agron., Univ. Milano, Italy]

Information is given on mugwort (*Artemisia vulgaris*), a noxious weed in many regions of northern Italy. The results from this investigation indicated that, under ordinary conditions of temperature, the seeds of this species require light to germinate, a very short period of light of low intensity being sufficient, and that refrigeration at +1°C. for 20 days induces some seeds to germinate even with the exclusion of light. Temperature and light have, therefore, a cumulative effect on the germination of these seeds. Dormancy of fresh seeds was broken by refrigeration at + 1°C. for 10-40 days.—E.B.O.

640 † STRYCKERS, J. Onkruidverdelgingsschema 1953-4 voor de verschillende teelten, met bestrijdingswijze van de voornaamste onkruiden. [**Weed control recommendations 1953-4 for different crops, with notes on the most common weeds.**] [Reprint from] *Land- en Tuinbouwjaarb.* 1953-4, p. 1. [Rijkslandbouwhogeschool, Gent]

Tabulated recommendations are given for the control, by chemical weedkillers, of weeds of pastures and field crops in Belgium. For each crop, specific herbicides are recommended for the weeds, or group of weeds, commonly occurring in that crop. In each case, the rate of application of the weedkiller and the developmental stage of crop and weeds at which the herbicide should be applied are indicated.—W.J.B.

641 † AGRICULTURAL GAZETTE OF NEW SOUTH WALES. **Some weeds and grasses cause harm to stock and man.** *Agric. Gaz. N.S.W.* 1953, **64,** Pt. 9, 460-3, illus.

Brief descriptions of, and the mechanical damage caused to humans and animals by, the following plants are given : galvanized burr (*Bassia birchii*), roly poly (*Bassia quinquecuspis*), Noogora burrs (*Xanthium spinosum* and *X. pungens*), perennial nettle (*Urtica incisa*), stinging nettle (*Urtica urens*), corkscrew or spear grasses (*Stipa* spp.), spear or wire grasses (*Aristida* spp.), barley grass (*Hordeum leporinum*), rat tail fescues or silky grasses (*Vulpia* spp.), spear grass (*Heteropogon contortus*), cape weed (*Cryptostemma calendula*), and shepherd's purse (*Capsella bursa-pastoris*).—M.A.

642 RIEPMA KZN, P. Het optreden van enkele akkeronkruiden in verband met zaaitijd en bodemstructuur. [**The occurrence of some weeds of arable land in relation to sowing date and soil structure.**] *Verslag Cent. Inst. Landbouwk. Onderz. 1952* Wageningen, 1953, 157-61, bibl. 4, illus.

The relation of the frequency of occurrence of foxtail (*Alopecurus myosuroides*), chickweed (*Stellaria media*) and *Matricaria chamomilla* to the sowing date of field crops and to the soil structure was investigated. *A. myosuroides* and *M. chamomilla* were especially abundant on fields with bad soil structure ; *S. media* was most abundant on fields with good soil structure. There was no apparent correlation between the sowing date of crops and the frequency of occurrence of *S. media* and *M.*

*chamomilla*. *A. myosuroides* was much less abundant on spring-sown than on autumn-sown fields. —W.J.B.

643 LINDSAY, D. R. **Climate as a factor influencing the mass ranges of weeds.** *Ecology* 1953, **34,** No. 2, 308-21, bibl. 13. [Cent. Exp. Fm, Ottawa]

Data are given of the distribution of 11 weed species in Wisconsin, on either side of the prairie/forest border ecotone. Observations are given on the correlation between their distribution and the climate of north and south Wisconsin. The behaviour of weeds in and out of their optimum climatic environments and the prediction of weed distribution from climatic data are discussed.—P.J.B.

644† FUNAIOLI, A. Aspetti del problema delle infestanti nella regione del medio Uebi Scebeli. [**Aspects of the weed problem in the region of the middle Webi Shebeli (Italian Somalia).**] *Riv. Agric. subtrop.* 1953, **47,** No. 7-9, 319-40, illus., English summary p. 340.

Information is given on the weeds of this region, which constitute the principal factor limiting crop yields, especially in native farming. The composition and development of the noxious flora is studied in relation to the cultivation, the physico-chemical nature and the moisture of the soil. The principal agents of dissemination of weed seeds are, firstly, the river water (used for irrigation), followed by tillage implements, wind, birds and other animals. A list is supplied of the principal weed species (scientific and local names are given), including those growing along and inside the irrigation and drainage channels. The control measures adopted are described.—E.B.O.

645† VANNELLI, S. Ricerche sulla flora infestante delle colture in Italia. 4. La flora infestante di un podere presso Montecatini Terme. [**Research on the noxious flora of crops in Italy. 4. Noxious plants on a farm near Montecatini Terme.**] *Nuovo G. bot. ital.* 1952, **59,** No. 2-4, 388-435, bibl. 12, illus., English summary pp. 434-5. [Ist. Bot., Univ. Firenze]

Information is given on the climate and soil of the region. The 241 weed species found on this farm are listed with an indication of their biological form and of their occurrence in the fields, or along paths, hedges and ditches. Of the total species, 53% were therophytes and 32% hemicriptophytes. Results from a bio-statistical study conducted on 8 plots show the frequency of various species, their root type and the effect of tillage on these species. The weed species found in annual crops (wheat, maize, potatoes, legumes and fodder catch crops), 78% of which are therophytes, are examined more particularly. Information is also given on the biological cycle and geographical distribution of the 36 most noxious weeds.—E.B.O.

646 BENNETT, E. **Weeds contain valuable chemical compounds.** *J. agric. Fd Chem.* 1953, **1,** No. 20, 1223. [Massachusetts Agric. Exp. Sta., Amherst]

Data are given of the total soluble sugar, pectic compound, furfural cellulose and alpha cellulose content of 24 weed species.—P.J.B.

647 WOLF, D. E. **Weed control. Pre-emergence methods.** *J. agric. Fd Sci.* 1953, **1,** No. 2, 181-3, bibl. 10. [Grasselli Chem. Dep., Exp. Sta., E.I. DuPont de Nemours and Co., Inc., Wilmington, Del.]

A brief review is given of current progress, with notes on types of treatment and susceptibility of crops to treatment.—P.J.B.

648 GERTSCH, M. E. **The influence of various carriers upon the inhibitory effectiveness of 2,4-D sprays.** *Weeds* 1953, **2,** No. 1, 33-42, bibl. 8. [Louisiana State Univ.]

649 LOGAN, A. V. and others. **The use of $C^{14}$ in a study of the leaching rate of isopropyl N-phenyl carbamate.** *Weeds* 1953, **2,** No. 1, 24-6, bibl. 7. [Oregon State Coll.]

Preliminary trials are reported on the effect of different simulated rainfall applications on the depth to which IPC is leached in the soil. Leaching of soil with 2 or 3 in. of rainfall caused the maximum concentration of IPC to move down to a depth of 3 in. within 96 hr. There was some evidence that leaching of IPC caused an initial removal of the herbicide to a relatively low level, but that there was a subsequent movement of the IPC upwards in the soil.—P.J.B.

650 MOORE, D. H. and others. **Carbamate herbicides. Evaluation of three carbamate herbicides in comparison with isopropyl N-(3-chlorophenyl) carbamate.** *J. agric. Fd Chem.* 1953, **1,** No. 19, 1154-8, bibl. 15. [Nat. Distil. Prod. Corp., Baltimore, Md]

651 SHAW, W. S. and SWANSON, C. R. **The relation of structural configuration to the herbicidal properties and phytotoxicity of several carbamates and other chemicals.** *Weeds* 1953, **2,** No. 1, 43-65, bibl. 18. [Weed Invest. Div., U.S. Dep. Agric., Beltsville, Md]

Observations are made on the possible mode of herbicidal action of carbamates on plants.—P.J.B.

# CROP BOTANY

(*See also individual crops.*)

652† Hunter, J. G. and Hall, A. **The determination of calcium in plants and soils.** *Analyst* 1953, **78,** No. 923, 106-10, bibl. 10. [Macaulay Soil Res. Inst., Craigiebuckler, Aberdeen]
The method described is intended for the semi-micro determination of amounts ranging from 0·05 to 0·5 mg. Ca, with an accuracy of ±5 %.—P.J.B.

653† Yuen, S. H. and Pollard, A. G. **Determination of nitrogen in the soil and plant materials: use of boric acid in the micro-Kjeldahl method.** *J. Sci. Fd Agric.* 1953, **4,** No. 10, 490-6, bibl. 20, illus. [Agric. Chem. Dep., Imp. Coll. Sci. Technol., London, S.W.7]

654† Jones, G. B. and Underdown, R. E. **Determination of nitrate in plant materials.** *Anal. Chem.* 1953, **25,** No. 5, 806-8, bibl. 11. [Univ. Adelaide, South Australia]
The method described utilizes anion exchange resins, followed by elution with sodium hydroxide and estimation by the xylenol method. The technique has high precision, takes less time than the phenol disulphonic acid method and can be used for routine field investigations.—P.J.B.

655† Moir K. W. **The determination of oxalic acid in plants.** *Qd J. agric. Sci.* 1953, **10,** No. 1, 1-3, bibl. 4.
A titrimetric adaptation of Myers' modification of Bau's gravimetric method for determining water and acid extractable oxalate in plant material is described.—Author's summary.

656† Rowley, R. J. and others. **Determination of fluoride in vegetation.** *Anal. Chem.* 1954, **25,** No. 7, 1061-5, bibl. 4. [Aluminium Res. Lab., Aluminium Co. of America, New Kensington, Pa]
The method described is designed to overcome inaccuracies arising from high contents of silica in the material analysed.—P.J.B.

657† Mathis, W. T. **Spectrochemical analysis of plant material using spark excitation.** *Anal. Chem.* 1953, **25,** No. 6, 943-7, bibl. 8. [Connecticut Agric. Exp. Sta., New Haven]

658 Petrišin, T. L. and Landau, S. P. [**The influence of the short-wave part of the solar spectrum on plants.**] [Russian] *Izvest. Akad. Nauk SSSR* (*Bull. Acad. Sci. USSR*) *Ser. Biol.* 1953, No. 6, 79-89, bibl. 11, illus.
This subject is discussed from a review of the literature and from results of the authors' experiments with leaves of beet and oat plants.—M.H.

659† Lehr, J. J. **Sodium as a plant nutrient.** *J. Sci. Fd Agric.* 1953, **4,** No. 10, 460-71, bibl. 25. [Pl. Nutr. Res. Lab., Chilean Nitrate Agric., Serv. Wageningen]
A general review is given of recent research into the role of sodium in plant nutrition.—M.A.

660† Arnon, D. I. and Wessel, G. **Vanadium as an essential element for green plants.** *Nature, Lond.* 1953, **172,** No. 4388, 1039-40, bibl. 10, illus.
The authors maintain that it "appears likely that vanadium, like other micro-nutrients . . . will be shown to be generally required by green plants."—M.H.

661 Peĭve, Ja. V. [**Micro-elements in agriculture.**] [Russian] *Priroda, Moskva* (*Nature, Moscow*) 1953, **42,** No. 11, 11-22, bibl. 3, illus.
This review article contains information from the work of Bamberg [contained in Proc. Conference on Micro-Elements, USSR Acad. Sci. 1952], who studied the amount of micro-elements in cereal grain and potato tubers grown under conditions of Latvian SSR. Tables quoted from Bamberg also show the content of micro-elements in seed and hay (made at the stage of flowering) of the following crops grown in Latvia (species not named): *Pisum*, *Vicia*, and *Lupinus*.—M.H.

662† Gard, L. N. and Rudd, N. G. **Herbicides determination. Isopropyl *N*-(3-chlorophenyl) carbamate (CIPC) in soils and crops.** *J. agric. Fd Chem.* 1953, **1**, No. 9, 630-2, bibl. 4. [Columbia South. Chem. Corp., Barberton, Ohio]
The lower practical limit of sensitivity of the method described is of the order of 0·05 ppm. concentrations of CIPC in plant material.—P.J.B.

663 Young, H. Y. and Gortner, W. A. **Micro-determination of 3-(p-chlorophenyl)-1, 1-dimethylurea [CMU] in plant tissue.** *Anal. Chem.* 1953, **25,** No. 5, 800-2, bibl. 4. [Pineapple Res Inst., P.O. Box 3166, Honolulu 2, Hawaii]

664 Smith, A. E. and Stone, Gracie M. **Micro-determination of *N*-1-naphthylphthalamic acid residues in plant tissues.** *Anal. Chem.*

1953, **25,** No. 9, 1397-9, bibl. 3. [Naugatuck Chem. Divn., U.S. Rubber Co., Naugatuck, Conn.]

665 Tibbits, T. W. and Holm, L. G. **Trichloroacetic acid. Colorimetric method for quantitative determination in plant tissue.** *J. agric. Fd Chem.* 1953, **1,** No. 11, 724-6, bibl. 6. [Hort. Dep., Univ. Wisconsin, Madison]

666 Williams, J. H. **Differential varietal response of root tissues to exogenous growth regulators in soybean, oats and corn.** *Agron. J.* 1953, **45,** No. 7, 293-7, bibl. 13. [Iowa Agric. Exp. Sta., Ames]

Studies were made on 93 varieties of soyabean, 142 of oats and 119 of inbred maize. Their germinating seeds were subjected to different treatments with growth-regulating chemicals. Among varieties of all 3 crops, there were highly significant positive correlations between their responses to 2,4-D, 2,4,5-T and naphthalene acetic acid, but negative, or very low correlations, between the responses to IPC and these chemicals. Differential responses to 2,4-D among varieties were found in all 3 crops. With soyabeans, concentrations of 2·5 ppm. 2,4-D appeared best for evaluating varietal differences in response ; with oats, 7·5 ppm. was best. The range of response to 2,4-D by oat varieties was much larger than among soyabean varieties. Other species of *Avena* did not show greater tolerance to 2,4-D than did *Avena sativa*—P.J.B.

667 French, R. C. and Beevers, H. **Respiratory and growth responses induced by growth regulators and allied compounds.** *Amer. J. Bot.* 1953, **40,** No. 9, 660-6, bibl. 16. [Purdue Univ., Lafayette, Ind.]

A series of experiments on segments of maize coleoptiles has confirmed that indole-3-acetic acid elicits respiratory stimulation when it is inducing growth in length, and a similar relationship was found to hold for 2,4-D and for 4 other less efficient growth regulators. Stimulations of $O_2$ uptake were also induced by certain critical concentrations of 2,4-dinitrophenol and 2,4-dichlorophenol, known to be uncoupling agents, and by indole and α-naphthol, but these stimulations were accompanied by strong growth inhibitions. The results accord with the idea that both types of respiratory stimulation result from an increased internal supply of P (" high-energy-phosphate ") acceptors. But while this increase is brought about in the case of the uncoupling agents by a non-production or non-useful breakdown of ATP (adenosine triphosphate), that induced by the growth regulators is supposed to result from some anabolic reaction which utilizes ATP for a growth process and which is catalyzed by the growth regulator. The increase in respiration is thus thought to be a consequence of the stimulation of growth.—From authors' summary.

668 Anker, L. **The effect of indole acetic acid and other growth substances on the endogenous respiration of the *Avena* coleoptile.** *Acta Bot. Neer.* 1953, **2,** No. 1, 22-63, bibl. 68, illus. [Bot. Lab., Utrecht Univ., Neth.]

The respiration of starved *Avena* coleoptile tissue was studied by means of the Warburg manometric technique. The addition of indole acetic acid in a concentration of 1 mg. per l. to sections starved for 24 hr. caused increases in oxygen uptake. The zone of maximal activity though generally situated between 5 and 10 mm. from the tip of the coleoptile was found in some cases in the lowest sections. When indole acetic acid was added to freshly cut sections a period of inhibition preceded a stimulation of oxygen uptake. The stimulative action of indole acetic acid on oxygen uptake lasted 20 hr. on the average. The addition of ethanol at a concentration of 40 mg. per l. increased the oxygen uptake of freshly cut sections by 8-23%. Alpha naphthyl acetic acid but not beta naphthyl acetic acid increased the oxygen uptake. The degree of stimulation effected by growth substances in non-growing sections of coleoptiles was equal to that in growing sections. It is suggested that the auxin action is exercised on the inner protoplasmic membranes, making the reserve food more accessible to metabolic processes.—W.J.B.

669 Audus, L. J. and Garrard, A. **Studies on the growth and respiration of roots. 1. The effects of stimulatory and inhibitory concentrations of β-indolylacetic acid on root sections of *Pisum sativum*.** *J. exp. Bot.* 1953, **4,** No. 12, 330-48, bibl. 12, illus. [Bedford Coll., Univ. London]

670† Audus, L. J. and Thresh, Ruth. **A method of plant growth substance assay for use in paper partition chromatography.** *Physiol. Plant.* 1953, **6,** No. 3, 451-65, bibl. 6. [Bot. Dep., Bedford Coll., Univ. London]

671 Vlitos, A. J. **Herbicide development.** *Agric. Chem.* 1954, **9,** No. 2, 45-7 and 117, bibl. 18. [Boyce Thompson Inst., Yonkers, N.Y.]

The mode of activation of 2-(2,4-dichlorophenoxy) ethyl sulphate in soil is discussed and observations made on certain hypotheses advanced to explain the action of plant-growth regulators in plants.—P.J.B.

672 Tombesi, L. Modulo enzimatico e coefficiente ossidasico di alcune specie vegetali. Nota 2. [**Enzymatic pattern and oxidase coefficient of some plant species. Note 2.**] *Ann. Sper.*

*agr.* 1953, **7,** No. 5, 1565-96, bibl. 7, illus., English summary p. 1595. [Sta. Chim-Agr. Sper., Roma]
[See also *Fld Crop Abstr.* 6 : 350.]

673† Ruggieri, G. Contributo allo studio su alcuni sistemi di transaminazione dei vegetali. [**A contribution to the study of some transamination systems in plants.**] *Ric. sci.* 1953, **23,** No. 7, 1208-13, bibl. 11, English, French and German summaries p. 1213. [Sta. Chim.-Agr. Sper., Roma]

Determination was made of the activity of the transamination reaction : glutamic acid + oxalacetic acid $\rightleftarrows$ α-ketoglutaric acid + aspartic acid, during the germination of seeds of *Pisum sativum* and *Vicia faba*, distinction being made between cotyledons and embryos. This activity was present at first in the cotyledons and later in the embryos. This same activity was determined separately for the leaves, roots and nodules of *V. faba* as well as for the leaves of *Triticum vulgare.* In *V. faba* the nodules showed greater transamination activity than the leaves and roots.—From author's summary.

674 Leopold, A. C. and Guernsey, F. S. **Interaction of auxin and temperatures in floral initiation.** *Science* 1953, **118,** No. 3060, 215-17, bibl. 10. [Purdue Univ., Lafayette, Ind.]

In studies with Wintex barley (long-day species), seed was soaked in a 0·1 ppm. auxin (naphthaleneacetic acid) solution for 24 hr. following which, the seed was exposed to temperatures of 3° C. or 18° C. for 2 weeks. The seed was then sown in a greenhouse under inductive photoperiod conditions (18 and 9 hr., respectively). Seed vernalized at 3° C. produced over twice as many flowering shoots as that vernalized at 18°C. The 18°C. treatment did not promote, and may have even inhibited, floral nitiation. In similar studies with Biloxi soyabeans short-day species), vernalization at 3°C. more than doubled the number of flowering shoots produced, compared with vernalization at 18°C., which ppeared to inhibit floral initiation. In other tudies on soyabeans, plants were grown up to the ge of 2 weeks in 18 hr. non-inductive photoperiods. The plants were then subjected to photo-inductive reatments (9 hr. photoperiod) for 5 days, half the lants being held during the 5-day period at 25°C. nd half at 10°C. At the start of this 5-day period olutions containing up to 100 ppm. auxin were pplied to the tip of the youngest leaf. At the end f the 5-day induction period, the plants were ransferred to 18 hr. photoperiods in greenhouses. ow concentrations (0·1 to 1 ppm.) of auxin romoted floral initiation in plants held at 10°C., ut inhibited floral initiation in plants held at 25°C. n trials with rye seed and excised embryos, auxin treatment combined with brief vernalization at low temperatures, almost doubled the number of spikelets per plant. The results of these studies showed that auxin could markedly modify floral initiation as influenced by photoperiodic treatment, vernalization, or indeterminate behaviour. It is suggested that appropriate control of temperatures to which seeds are exposed following auxin treatment may increase the value of such treatments in promoting flowering.—P.J.B.

675† Lona, F. and Bocchi, A. L'azione ipoauxinizzante delle sostanze fotodinamiche sulla piantà e relative manifestazioni morfogenetiche, organogenetiche, di correlazione e di differenziazione. [**The antiauxinic action of photodynamic substances on the plant and relative morphogenetic and organogenetic effects, and effects of correlation and differentiation.**] *Nuovo G. bot. ital.* 1952, **59,** No. 2-4, 511-14, bibl. 10, English summary p. 514. [Ist. Bot. Univ. Parma, Italy]

The antiauxinic action of eosin was demonstrated on the short-day plant *Perilla ocymoides* var. *nankinensis* grown under long-day conditions. [See also *Herb. Abstr.* 21 : 599 and 600.]—E.B.O.

676 Verduin, J. **A table of photosynthetic rates under optimal, near-natural conditions.** *Amer. J. Bot.* 1953, **40,** No. 9, 675-9, bibl. 25. [Ohio State Univ.]

A table of photosynthetic rates (micromoles $CO_2$ absorbed, or $O_2$ evolved per hour) under optimal, near-natural conditions, prepared for the *Handbook of Biological Data*, is presented and discussed. The rate reported for temperate-zone herbs, including crop plants, is 4 $\mu$mol. $CO_2$/cm.$^2$/hr. The highest rates per cm.$^2$ soil or water were those reported for [lucerne] plots, namely, 18. Plants in nature show photosynthetic and respiratory rates adapted to the factor intensities prevailing in their respective habitats.—From author's summary.

677† Middleton, W. E. K. **Spherical illumination as an ecological parameter, and an improved integrator.** *Ecology* 1953, **34,** No. 2, 416-21, bibl. 4, illus. [Phys. Div., Nat., Res. Coun. Ottawa, Ontario]

Constructional details are given of an integrating spherical illumination meter.—P.J.B.

678 Aslyng, H. C. and Kristensen, K. J. **Investigations on the water balance in Danish agriculture.** *K. VetHøjsk. Aarsskr.* 1953, 48-90, bibl. 28, illus.

Data are given of the moisture evaporation from soils under different crops, as determined in field and lysimeter studies. The field studies were carried out at a number of locations in Denmark. Total evaporation from the soil over the period from

1 April until the soil was saturated to about the same field capacity 7 or 8 months later, was 300-400 mm., a value only slightly affected by location and crop. Evaporation from soil under root crops in early summer was less than that under cereal crops, but slightly greater in August and September. Observations are given on the depth of root development of the crops.—P.J.B.

679 HØJENDAHL, K. **Recording the climate in the Old Experimental Field** [**near Copenhagen**]**. Construction and test of suitable apparatus.** *K. VetHøjsk. Aarsskr.* 1953, 21-47, bibl. 8.

Notes are given on the construction and use of an integrating photometer for use in recording light energy falling on a soil surface, and on the use of soil thermometers, water-table recorders, soil tensiometers, and hygrometers. Data are given of the monthly mean temperatures of the air above, and at different soil depths under, pasture, bare soil, oats and wheat crops. Soil tensiometer data showed that hydraulic head readings began to decrease rapidly when plant roots reached the tensiometer cups, and this may provide a means of recording root growth.—P.J.B.

680† RUBIN, B. A. [**Some questions relating to the theory of plant acclimatization.**] [Russian] *Usp. Sovrem. Biol.* (*Adv. mod. Biol., Moscow*) 1953, **36,** No. 1 (4), 25-42, bibl. 28, illus.

In this review of the literature of the subject (covering the period 1930-51) it is emphasized that the capacity of plants to develop in different geographical zones depends on the degree of plasticity attained by the plants' physiological functions, primarily the metabolic processes. For example, the leaves and stems of the potato plant can withstand a temperature of —8°C. in the high Pamirs, but in lowland areas they perish at —0·5°C. In the Pamirs, potato plants contain a quantity of oil which is never found in such plants grown in the lowlands. This has been attributed to the fact that oil-forming processes in plants are strengthened by low air temperatures and increased moisture (as postulated by Ivanov in 1934).—M.H.

681 NISSEN, T. V. Om mikrobiel antagonisme og om antibiotica i jordbunden og mulighederne for praktisk anvendelse af disse faktorer. [**On microbial antagonism and antibiotics in the soil and the possibilities of the practical application of these factors.**] *Tidsskr Planteavl* 1953, **56,** No. 4, 633-59, bibl. 122.

A review is given of the recent literature on: (a) microbial antagonisms in soil, (b) the biological control of plant pathogens by the use of antagonistic effects and antibiotic substances, (c) the stability of antibiotics in the soil, (d) the uptake of antibiotics by plants, and (e) the stimulation of plant growth by antibiotics.—From author's summary.

682 SCHARRER, K. and BÜRKE, R. Der Einfluss der Ernährung auf die Provitamin-A-(Carotin)-Bildung in landwirtschaftlichen Nutzpflanzen. [**The effect of fertilizers on the development of Provitamin A (carotene) in agricultural plants.**] *Z. PflErnähr. Düng.* 1953, **62,** No. 3, 244-62, bibl. 11. [Agrik-Chem. Inst., Justus Liebig Hochsch., Univ. Giessen]

Pot fertilizer experiments were carried out in 1951-2 on plants of *Lolium westerwoldicum*, oat, maize and sugar-beet to determine the effect of N, P, K, Ca, Mg and Na on the carotene content of these plants. Applications of both N and P increased the carotene content. The effect of K was linked with that of N: higher additions of K in relation to N decreased the amount of carotene in *L. westerwoldicum*. Normal application of Mg, Ca and Na raised the carotene content, but excessive doses of Ca and Na depressed it. Nitrogen in the form of nitrates and K in the form of $K_2SO_4$ were more effective in the biosynthesis of carotene than ammonium salts or KCl.—M.A.

683 SENGBUSCH, R. von. Ein Beitrag zur Entstehungsgeschichte unserer Nahrungs-Kulturpflanzen unter besonderer Berücksichtigung der Individualauslese. [**Contribution to the history of cultivated food plants, with special reference to individual selection.**] *Züchter* 1953, **23,** No. 12, 353-64, bibl. 28. [Max-Planck Inst. Züchtforsch., Hamburg-Volksdorf]

This historical review is based on the selective production from wild material of *Lupinus* spp., the alkaloid-free strains in particular, and discusses means of converting into providers of food other plants at present useless because of the presence of some element which is either ill-tasting or indigestible, or definitely toxic.—G.M.R.

684† INTERNATIONAL SEED TESTING ASSOCIATION. **International rules for seed testing.** *Proc. internat. Seed. Test. Ass.* 1953, **18,** No. 1, 1-69.

The international rules for seed testing reported in this paper were adopted by the 1953 Meeting of the International Seed Testing Association, held in Dublin, and will come into force in July, 1954, in the Northern Hemisphere and in January, 1954, in the Southern Hemisphere. The rules cover the following aspects: sampling, purity analysis, determination of the number of noxious seeds per unit weight of seed, germination tests, determination of pests, diseases and other conditions of health, determination of genuineness of type, variety and strain, and of moisture content, ultraviolet tests for *Lolium* spp. seed, determination of provenance, 1000-grain weight and volume-weight, tolerances and international seed analysis certification.—P.J.B.

685† GILMOUR, J. S. L. **International code of nomenclature for cultivated plants.** *J. nat. Inst. agric. Bot.* 1953, **6,** No. 3, 494-500. [Code obtainable from : The R.H.S., Vincent Square, London, S.W.1. Price 1s.]

The *International Code of Nomenclature for Cultivated Plants* seeks to provide a set of comprehensive and easily workable rules for naming cultivated varieties of plants, or cultivars ; it deals primarily, therefore, with vernacular names, e.g. perennial ryegrass " Scotia," as opposed to botanical names, such as *Dactylis glomerata*, which are covered by the *International Code of Botanical Nomenclature.* The Code, in its present form, is the joint product of the Stockholm Botanical Congress, 1950, and the London Horticultural Congress, 1952, and the main work on it was carried out by those interested primarily in horticulture. In consequence, some of the more specialized needs of agriculture may not be fully met by the text as it stands and suggestions for its improvement should be sent to the Secretary, International Committee on Horticultural Nomenclature and Registration, c/o The Roy. Hort. Soc., Vincent Square, London, S.W.1. One of the most important sections of the Code deals with the registration of the names of cultivars and lays emphasis on the importance of setting up international authorities for this purpose. The provisions of the Code (which are summarized) are on trial until the next International Horticultural Congress.—C.L.S.

686 GILMOUR, J. S. L. **The new code for the naming of cultivated plants.** *J. roy. hort. Soc.* 1954, **79,** Pt. 1, 12-21.

The author's aim is to explain the meaning of the new Code for the nomenclature of cultivated plants. This new code is not concerned with wild species or varieties but with plant forms which have been evolved by man through selection, hybridization or other processes. These so-called " garden varieties " are to be named "cultivars." The method of writing cultivar names is described; the cultivar name follows, in Roman type and within single quotation marks, the generic and specific names of the plants which are written in italics. The general considerations to be observed when naming new cultivars, including the naming of cultivars derived from crosses between 2 or more species, are discussed in detail. Examples are given of the main principles to be kept in mind when choosing cultivar names. Where a number of cultivar names have been applied to more than one cultivar, the procedure to be adopted is explained. The problems of registration of cultivar names are briefly discussed.—M.A.

## MISCELLANEOUS

687† GLOVER, J. and ROBINSON, P. **A simple method of calculating the reliability of rainfall.** *E. Afr. agric. J.* 1953, **19,** No. 1, 11-13, bibl. 1, illus.

By means of a simple series of calculations, the determination of the extent to which rainfall in any one season may fall below, or rise above, the general average can be quickly made. Two examples are given.—M.A.

688† GREAT BRITAIN. National Agricultural Advisory Service. **Spells of dry weather in Eastern England. Spells of dry weather in South-East England.** *Rep. Agric. Met. Branch, Met. Office* 1953, pp. 15 and 18, respectively, illus. [Restricted issue and circulation]

These two papers have as their main objects : (a) the provision of a method for estimating the frequency of dry weather spells of various durations in each month from April to September, with particular emphasis on spells of 3, or more, days ; and (b) the numerical estimation of the relative suitability for haymaking of different months at different places.—P.J.B.

689 NATIONAL AGRICULTURAL ADVISORY SERVICE. **Bridget's ; Cuckoo Pastures ; Cleadthorpe ; High Mowthorpe ; Rosemaund ; Great Hause ; Terrington and Trawscoed Experimental Husbandry Farms.** *Fm Guide NAAS* 1952 and 1953, pp. 19 ; 19 ; 20 ; 42 ; 38 ; 8 ; 24 and 35, respectively.

Field records of 8 N.A.A.S. experimental husbandry farms are given in the form of farm guides for 1952-3. Details of long-term experiments and suggestions for future experiments are included. Each guide is illustrated with a farm map.—M.A.

690 KERKHAM, R. K. **Notes on the principal annual food crops.** *Uganda Dep. Agric.* 1953, pp. 59. [Entebbe]

Particulars of the cultivation, harvesting, varieties, yields, and pests and diseases of the principal annual food crops grown in Uganda, as well as other information of interest, are given. The vernacular and common names of the crops are also included.—M.A.

691† NEW ZEALAND Department of Agriculture, Extension Division. **Crop production.** 1953, pp. 156. [Wellington]

Information is supplied on the growing in New Zealand of the following crops: barley, blue lupins (*Lupinus angustifolius*), linseed, maize, mangels, oats, peas, wheat, potatoes, rape, thousand-headed kale and chou-moellier, turnips and swedes.—M.H.

692† BARRAU, J. **Research in Queensland on tropical plant and animal industries.** *Tech. Pap. 43. S. Pacific Comm.* 1953, pp. 72, illus.

This paper gives a general outline of the organization of current agricultural research in Queensland. An outline of current research on the following crops is given: groundnuts, linseed, soyabeans, sunflower, cotton, jute, kenaf (*Hibiscus cannabinus*), pink burr (*Urena lobata*), rice, maize and sorghum. Chapters are devoted to research on pasture and fodders and weed control. The inclusion of references to leaflets, bulletins and pamphlets published by the Government makes this paper a useful source of reference to those engaged in agriculture and allied industries in the South Pacific.—M.A.

693 SOYER, L. L'activité de l'INÉAC dans les territoires du Ruanda-Urundi en 1952. [**The activity of INEAC in Ruanda-Urundi in 1952.**] *Bull. Inform. INÉAC* 1953, **2,** No. 4, 209-41, illus.

This brief account of the activities of INÉAC in the Ruanda-Urundi includes improvement work carried out on sorghum, maize, *Eleusine* sp., wheat, rice, barley, pea, bean, groundnut, soyabean, potato, sweet potato, cassava, sunflower and cotton. The most promising varieties are mentioned.—E.B.O.

694† FREI, E. Bodenuntersuchung auf neuem Wege. [**A new approach to soil investigations.**] *Mitt. schweiz. Landw.* 1953, **1,** No. 12, 180-2, illus.

[See also Abs. 59 and 330.] An experiment was carried out on a number of sunflower plants to compare the effect of varying quantities of K added to a nutrient solution on the rate of transpiration of these plants. In contrast to Arland's findings, normal plants supplied with balanced nutrients showed the highest transpiration rate. Dr. Arland's thesis that the transpiration of plants is comparable to a 'feverish perspiration' is considered unsound, as transpiration and water uptake are shown to be at the highest level where the optimum quantity of plant foods is supplied. The conclusion is reached that the 'wilting method' is not suitable for the determination of the nutrient requirements of a soil.—M.A.

695 AMBERGER, A. and HOFMANN, E. Zur Frage der Wirkung von Dicyandiamid auf den Pflanzenertrag. [**The effect of dicyandiamide on plant yield.**] *Z. Acker- u. Pflbau* 1953, **97,** No. 2, 221-30, bibl. 7. [Tech. Hochsch. München-Weihenstephan]

The effect of dicyandiamide on the yield of crop plants was tested in comparison with calcium nitrate. On short-lived plants (oats and summer barley) under unfavourable climatic conditions (summer drought) dicyandiamide had little and sometimes no effect. The effect on sugar-beet was good and little inferior to that of calcium nitrate, although later of achievement, and a small additional dose of saltpetre was necessary to avoid reduced sugar yield. In a rotation with winter wheat as the first crop, there was good grain but reduced straw yield, while the after-effect of dicyandiamide on the following winter barley and potatoes was very good. Dicyandiamide, after breakdown and under suitable management, is regarded as a useful source of N, slow but of continuing effect, rather than as poisonous to plants.—G.M.R.

696 SEN, S. and others. **Manurial value of ammonium nitrate alone and admixed with varying proportions of T.N.T.** *Indian J. agric. Sci.* 1952, **22,** Pt. 4, 389-95, bibl. 6. [Indian Agric. Res. Inst., New Delhi]

The manurial values of ammonium sulphate, ammonium nitrate and ammonium nitrate mixed with varying percentages of T.N.T. (from surplus military stocks) were compared in trials carried out in 1944-6. All manures were applied to sorghum, wheat, cotton and rice at the rate of 40 lb. N per ac. and to maize at 20 lb. per ac. Although the manured plots gave, in all cases, significantly or almost significantly greater yields than the unmanured control plots, there was no significant difference between the effects of the different manurial treatments. The presence of T.N.T. in concentrations of 1, 2 and 3% in ammonium nitrate had no adverse effects on the crops.—W.J.B.

697 UHLEN, G. Orienterende forsøk med meitemark. [**Preliminary experiments with earthworms.**] *Forskn. Fors. Landbr.* 1953, **4,** No. 2, 161-83, bibl. 18. [Agric. Coll. Norway, Aas]

In trials in frames and pots, the addition of earthworms to soil to give populations of the order of those found in soil under conditions particularly favourable to them, the yield of either oats or barley grown on the soil were significantly raised by an average of 18, 22 and 5% during 1946, '47 and '52, respectively, compared with the yields of these crops grown on soil free of earthworms. Yield increases were highest where farmyard manure, but no artificial manure, was applied. It is stressed that these results may not apply fully to field conditions, since the trials were carried out for only 2 to 3 months in each year.—P.J.B.

698 NARAYANAN, E. S. **Red-hairy caterpillar, *Amsacta moorei* Butler, and its control.** *Indian Fmg* 1953, **3,** No. 6, 8-9, illus. [Indian Agric. Res. Inst., New Delhi]

The appearance, habits and life-cycle of the red hairy caterpillar are described and the control of the pest, which attacks numerous field crops, is discussed with reference to its life-cycle. The following control measures are recommended: (1) deep ploughing, after removal of summer-grown crops, to kill hibernating pupae, (2) manual removal of egg-masses from leaves, (3) digging of protective trenches 8 in. deep around cultivated fields, (4) in case of severe attacks, dusting with 1 part sodium fluosilicate mixed with 8 parts road dust or 4-5% BHC applied at 10 lb. per ac.—W.J.B.

699 THOMPSON, H. V. and ARMOUR, C. J. **Power gassing of rabbits.** *Agriculture, Lond.* 1953, **60,** No. 8, 383-6, illus.

Methods of gassing rabbits with cyanide gassing powders, using petrol-driven compressors and impellers, are described.—W.J.B.

700 STAHLER, L. M. **Contact herbicides as pre-harvest defoliants or desiccants.** *J. agric. Fd Chem.* 1953, **1,** No. 2, 183-7, bibl. 10. [Pl. Industr. Bur., U.S. Dep. Agric., Columbia, Mo.]

A review is given of developments in the use of defoliants and desiccants in the USA. Among aspects considered are: the characteristics required of defoliants and desiccators, potato haulm killing, defoliation of soyabeans and cotton and the use of desiccants in seed crops. Brief notes are given on dust and spray materials in current use.—P.J.B.

701† GREAT BRITAIN. Department of Scientific and Industrial Research. **Scientific research in British universities 1951-52.** 1952, London; H.M.S.O., pp. 485, 8s. 6d.

702 GREAT BRITAIN. Association of Special Libraries and Information Bureaux. **Index to theses accepted for higher degrees in the universities of Great Britain and Ireland. Vol. 1, 1950-51.** 1953, pp. 157.

A section on agriculture and forestry is included on pp. 83-6.—P.J.B.

# BOOKS AND REPORTS

## BOOKS

703 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Bull. No. 153. Sugar-beet cultivation.** 1953, pp. iv. + 98, illus., London; H.M.S.O., 25 × 15 cm., 5s.

This is the first bulletin on sugar-beet cultivation prepared by the Ministry of Agriculture and Fisheries of Great Britain. It is mainly intended to provide practical information for the grower and gives a very full account of recommended cultivation practices for the crop under British conditions. Among other aspects considered are: factory requirements of the crop, strains of sugar-beet, harvesting, utilization of by-products and ensiling of sugar-beet tops. The bulletin is provided with extensive tabular data, mostly derived from experiments carried out by the British Sugar Beet Research and Education Committee and there are illustrations, including a number in colour, showing symptoms of different nutritional deficiencies in sugar-beet plants.—P. J. Boyle.

704 BROWN, C. H. **Egyptian cotton.** 1953, pp. xi + 174, bibl. 17, illus., London; Leonard Hill, Ltd., 22 × 14 cm., 16s.

If it is to be deplored that no general account of the Egyptian cotton crop has appeared until now, we are the gainers in that the task has been left to Mr. C. H. Brown, who fulfils it with competence and lucidity. Written with the authority of thirty years' research experience on the cotton crop, his book is an admirable complement to the more specialized writings of Dr. Balls.

The author's style is attractively simple, rarely using terms which the interested layman cannot understand. In places, indeed, we could wish for a little more scientific detail. Mr. Brown confesses himself a heretic on statistical 'significance', and true to his principles he does not inform us of the significance of the experimental results he quotes. In the discussion on the nitrogenous manuring of the crop, no reference is made to the results of Crowther and his co-workers on the interaction of nitrogen, water-supply, spacing and variety. While the very high seed-rate used in Egypt is admitted and apparently condoned by the author, no experimental results are quoted to enable us to pass judgment on it. Again, one wonders whether the practice of re-sowing, sometimes twice, though it may increase yield, has been shown to give an economic return ; it does not do so in some other cotton-growing countries.

But Mr. Brown is a plant-breeder, and it is the chapters on cotton breeding and testing which are the heart of the book and which will be regarded as an authoritative exposition. It is interesting that the author regards the building of a spinning-test mill at Giza as the most important single development in his time. The technicians in Egypt's service have indeed built up a cotton-breeding organization in which Mr. Brown may well feel proud to have shared, and which he was the last Englishman to leave.

Readers in other cotton-growing countries will be interested in both the similarities and the differences between their own and Egyptian conditions. Among the former we may note the perpetual urge to produce new varieties ; the preoccupation with pests and diseases ; and the volume of legislation applied to the crop—legislation often not enforced, but perhaps less so in Egypt than in other countries. Among the differences is the relative freedom of Egyptian cotton from disease—there is no leaf-curl, blackarm results in no economic damage and *Fusarium* wilt is easily controlled. As compensation, Egypt has, perhaps, more than its share of cotton pests, and its own special problem in the cotton leaf worm, *Prodenia litura.* On bollworms, the important point is made that damage is not to be assessed by the annual losses only, but by the potential crop which is lost because higher-yielding, late-maturing varieties cannot be grown owing to the bollworm threat. A minor observation of interest is the harm caused by dust on the foliage of crops near roads, a point which is becoming of increasing importance in tropical countries where the volume of traffic on dirt roads is increasing.

There is one question on which any writer on Egyptian agriculture must expect his views to be anxiously scrutinized—the future of the cotton industry. Egypt's rapidly-growing population and her dependence on a single export crop pose vital problems on which Mr. Brown's perspective is of interest. The great twin dangers of irrigation, a rising water-table and increasing soil salinity, are comparatively lightly passed over, though of the latter it is admitted that " evidence of salt accumulation in many of the older cultivated areas in Egypt must make any observer unhappy" (p. 28). In the controversy of food-crops versus cotton, Mr. Brown takes a firm stand on the belief that it will pay Egypt best to continue to grow a large cotton crop and import food with the proceeds. The projected break-up of large estates leads him to fear some threat, in the short term at least, to cotton yield and quality. In his opinion, agricultural extension services, especially for the smaller farmer, need some improvement.

The book has a foreword by the Chairman of the Raw Cotton Commission, an index, and a short bibliography where a much longer one would have been preferred. *Egyptian Cotton* will take its place without difficulty as a standard work on the subject.—G. B. Masefield.

705 HADFIELD, J. W. **Linen flax fibre production in New Zealand.** 1953, pp. x + 125, illus., New Zealand ; Linen Flax Corp. and Dep. Agric., Industr. and Commerce, and Sci. Industr. Res., 25 × 15 cm.

The cultivation and processing of fibre flax are amongst man's earliest agricultural activities, yet the industry still remains balanced on an economic razor's edge. The present volume leaves little doubt that in few other crops do so many diverse factors play an important role in maintaining the balance favourably.

A brief introduction relates flax to the other fibre-producing plants and describes the utilization of the component parts of a typical crop.

Part I reviews the establishment of the industry in New Zealand from the initial investigations in 1936, through the rapid wartime expansion into the present post-war phase. The description of machinery and building construction, the development of a production programme based broadly on the Belgian plan, and the transition from " battleship economy " to reduced post-war operation, illustrates the difficulties attending the establishment of a completely new agricultural industry in a climate which is admittedly sub-optimal for the crop. The future of the industry is discussed in relation to the strategic necessity for maintaining a peace-time nucleus capable of rapid expansion.

Part II contains a good general account of the climatic and cultural requirements of fibre flax, describes the agronomic techniques practised in the traditional flax-growing areas of West Europe, and shows how the crop has been fitted to the soil, climate and agriculture of New Zealand. Some errors on p. 60 require correction. J.W.S. was not developed by the Irish Department of Agriculture, but by the Linen Industry Research Association under the direction of Dr. Vargas Eyre, following work initiated in England by the British Flax and Hemp Growers Association. It was named in honour of an Ulster grower, Mr. J. W. Stewart, whose pioneer work (1903-6) resulted in the commencement of flax breeding by the Department of Agriculture and Technical Instruction for Ireland (1910). Stormont Gossamer and Stormont Cirrus were developed from Russian selections made by the late W. J. Megaw in 1918 and handed over to the newly-established Stormont station in 1923. Neither was derived from J.W.S.

Insect pests are casually dismissed as unimportant (p. 68). One assumes that this is intended to apply only in New Zealand conditions. If so, they are fortunate to be spared the attention of leather jacket grubs (*Tipula* spp.) after lea, or flea-beetle (*Longitarsus parvulus*) on brairds in hot, dry weather. The standard use of mercurial dusts for seed disinfection is somewhat mystifying when more effective control of browning (*Polyspora lini*) and seedling blight (*Colletotrichum lini*) is admittedly obtained with trimethylthuriam disulphide.

Part III opens with a brief account of the stem- and fibre-structure of fibre flax, reviews the techniques in general use for crop processing, and describes their application in New Zealand. Fibre extraction is based on the standard Courtrai single ret, followed by turbine scutching. The mechanization of field spreading and lifting the dried retted straw is interesting.

The book often illustrates the value of a fresh view-point untrammelled by tradition. It stresses the economic importance of byproduct utilization, and is well worth the attention of all those interested in flax fibre production.—E. V. B. Wilson.

706 Vasconcellos, J. de C. E. O. arroz. (Estudo botânico.) [**Rice. A botanical study.**] 1953, pp. 301, bibl. 168, illus., Lisbon; Minist. Econ. Affairs, Rice Comm., 16 × 23 cm.

This comprehensive study of the botany of the rice plant, combined with a detailed account of the varieties of rice cultivated in Portugal, is an amplification of the author's previous publications on the same subjects. The system recommended for the identification of the cultivated varieties of rice is based on a study of the organs of the rice plant, which are described in detail. Chapters are devoted to plant physiology and to disease resistance. The origin and systematics of *Oryza sativa* are also considered and a key is provided for the identification of the botanical varieties of the subspecies *sativa*, *japonica*, *brevindica* and *brevis*. The second half of the book is devoted to botanical descriptions, illustrated with photographs, of each of the cultivated varieties of rice grown in Portugal. —W. J. Baulkwill.

707 Borasio, L. Tre mesi nei paesi risicoli dell'Oriente. [**Three months in the rice countries of the East.**] 1952, pp. 109, bibl. in text, illus., La Sesia, Vercelli, 31 × 22 cm. [Sta. Sper. Risicolt. Vercelli, Italy]

This is an account of a scientific-technical mission to the East (Oct. 1951-Jan. 1952) which was arranged following an agreement between the Thailand Government and some Italian manufacturers of fertilizers. The countries visited, besides Thailand, were Egypt, India, Pakistan, Java and Ceylon. The object of the journey was to study local conditions with a view to improving rice cultivation in those countries where the soil is generally poor and rice yields low (Egypt excepted). The general information given on rice-growing in the world, including rice manuring in Italy, is followed by separate reports on the various countries visited. —E. B. Owen.

708 Aiyer, A. K. Y. N. **Principles of crop husbandry in India.** 2nd edn., 1953, pp. 550, bibl. 56, illus., Bangalore; Print. and Publ. Co., Ltd., 22 × 24 cm., Rs. 17-8.

Those readers already acquainted with the principles of soil science and crop production which are treated in this book will find interesting accounts of the application of these principles to Indian conditions in the chapters on the soils of India, irrigation, drainage, methods of tillage, rotation of crops and dry farming. An outstanding feature of the book is the way in which the limitations of the application of science to small-scale peasant farming are constantly kept in view; at the same time special sections are devoted to the consideration of large-scale mechanized farming.—W. J. Baulkwill.

709† Malcolm, D. W. **Sukumaland, an African people and their country.** 1953, pp. xvix + 224, illus., London; G. Cumberlege. Oxford Univ. Press [for Internat. Afr. Inst.], 23 × 14 cm., 30s.

Of all the peoples of Tanganyika, the Sukuma are among the most worthy. This tribe, large by East African standards, since it numbers over a million, thickly spread over the southern and south-eastern hinterland of Lake Victoria, is politically well organized under hereditary much respected chiefs, (cheerful, industrious, law-abiding, untroubled by irrelevant ambitions) and has long been regarded as one of the most rewarding, if not the most exciting, among which to work. Administrators and the professional and technical officer of government have met this responsiveness on the part of the tribe with a high concentration of enthusiastic effort, with the result that Sukumaland to-day presents as happy a picture of co-operation between government and people as is to be found anywhere in Africa.

Mr. Malcolm spent twelve years in all among the Sukuma, and many of the plans which the Government has adopted for the reorganization and rehabilitation of their country are based on the studies which provide the substance of this book. The title is a little misleading and we must not expect to find in the book more than the author explicitly intended to put into it. It does not claim to be more than a study of land use. Any descriptions there are (and they are not lacking) of the people, their customs, their political system, their economics, their distribution, their agriculture, their attitude to cattle, the topography of their country, are all subordinate to the main theme, which is precisely the use they make of their land. Having understood this, the reader will not be disappointed, for within the limits that the author, has set himself the book is satisfying. Beginning with a description of the environment (topography, climate, etc.) Mr. Malcolm goes on to examine the factors relevant to his subject ; and because land is still the basis of the African's way of life, this examination ranges wide. It includes the most spectacular and promising of modern developments in Sukumaland, the federation of all fifty-one chiefships into a single unit of local government, the Sukuma Federation, with its headquarters at Malya. This organization, working in contiguity to, and in close collaboration with, the special inter-district and inter-departmental " development team ", is a potentially powerful instrument for the efficient and properly co-ordinated rehabilitation of the area.

That Sukumaland needs rehabilitation Mr. Malcolm does not doubt, nor will any of those who have been privileged to live there : the soil is poor, fearfully subject to erosion of all kinds and the land is in places badly infested with harmful weeds; most of the trees have now been cut down ; rainfall is irregular and water scarce ; many parts of the country harbour tsetse fly. The Sukuma themselves make the usual African mistakes in the utilization of their land and pastures, thereby aggravating the pressure on available space. Among the more important parts of the book are those where Mr. Malcolm explains why such and such a deleterious practice is followed and why some reform (to us obviously desirable) is not adopted. An understanding of these things is the necessary basis for the " patient educative work " which, as the author says (and who will disagree with him ?) is the means whereby radical improvements can be brought about. As to the lines which such improvements should follow, Mr. Malcolm makes many suggestions which all seem very sensible and which no doubt continue to guide the work of the " development team."

The appendix contains a description of water catchment works (which authorities in other similar areas might do well to study), notes on soils and vegetation, a glossary, and there is a useful bibliography. The text is well illustrated with maps, plans, diagrams and photographs. The index is helpful.

The book does not make light reading (the style could be livelier and the presentation better organized) but it is an essential for those with interests in Sukumaland, while those more generally concerned with African land use may read it with profit. Moreover, at a time when " colonialism" is subject to much ignorant denigration, it comes as a useful corrective, as much a tribute (if an unconscious one) to the knowledge, zeal and sympathy of the author and his colleagues as a description of certain aspects of the life of people among whom they labour.—A. Sillery.

710 † NORMAN, A. G. (Ed.) **Advances in agronomy. Vol. 5.** 1953, pp. x + 422, New York ; Academic Press, Inc., 23 × 14 cm., $8·80. [For earlier issues in this series see *Fld Crop Abstr.* 5 : 309, 310 and 6 : 817, 1589.] The following note is extracted from the editor's preface : " With this, Volume 5, there will have been published more than forty articles, no two of which cover the same ground. Along with many additional subjects yet to be treated, it is our intention to return to some of these forty topics in later volumes in order to present progress reports on the most recent advances.

" In this volume the only new departure is the inclusion of a review of somewhat unusual length, recounting authoritatively the history of the establishment of a major crop in the United States. The agronomic advances that have been made with wheat have been less generally recognized and publicized than those with some lesser crops. It is, therefore, salutary to look backward as well as forward in this case in order to see the distance that has been traversed, as well as the paths that lie ahead. This has been done by Dr. Salmon and his colleagues for the U.S., and by Dr. McKibbin and Dr. Goulden for Canada. Taken together, these constitute a comprehensive account of wheat improvement on the North American continent."

The contents of this work include : a half century of wheat improvement in the United States—by S. C. Salmon and others ; progress in agricultural engineering—by L. W. Hurlbut ; the changing pattern of agronomy and horticulture in Canada—by R. R. McKibben ; soil management for conservation and productivity—by O. R. Neal ; chemical weathering of minerals in soils—by M. C. Jackson and G. D. Sherman.—M. Hall.

711 † PIERRE, W. H. and NORMAN, A. G. **Agronomy. A series of monographs. Soil and fertilizer phosphorus in crop nutrition. Vol. 4.** 1953, pp. xvi + 492, New York ; Academic Press, Inc., illus., $9.00, 23 × 14 cm. [Ames, Iowa, (W.H.P.) and Ann. Arbor, Michigan (A.G.N.)]

[For earlier issues in this series see *Herb. Abstr.* 23 : 649.] In the 25 chapters of this work, the subject is considered from the following aspects : soil/plant relationships ; soil phosphorus and its availability to the plant ; the use of P fertilizers and the relationship of soil management practices to P availability ; phosphorus fertilizer resources ; and the P status of the soil, crop requirements and potential fertilizer needs in world food production. The reviews are concerned essentially with USA literature and problems in the USA, exceptions to this being chapter 1 on phosphorus in the green plant, chapter 14 on factors influencing phosphate usage in Great Britain, and chapter 15 on world phosphorus fertilizer production, consumption and potential needs. The high standard of production of the earlier publications is maintained in this latest work.—M. Hall.

712† Wyllie, J. **Farming records and accounts.** 1953, pp. xiii + 310, tbl. London ; Butterworth's Sci. Publ., 22 × 13, 30s.

Despite its title, this is not just another treatise on farm book-keeping. The author is here concerned with forging that vital link between recording and management which should provide the main basis for the reasonable solution of problems in farm organization and management.

It is probable that to-day most farmers keep some accounts. Usually they are almost entirely of a financial nature and are of very limited managerial value. Mr. Wyllie describes how an integrated system of physical and financial records can provide a true diagnosis of major troubles in the organization of a farm business, and, at the same time, enable a systematic check to be kept on the day-to-day working of the farm.

In Parts I and II, Mr. Wyllie describes and illustrates the physical records and financial accounts which are needed for management purposes, the section devoted to the former being particularly valuable. In addition, the author has added useful comments on the use of these records, drawn from his very considerable experience. A short chapter in this section is devoted to cropping records ; the relationship between the need for them and the size of farm is emphasized. Some limitations of grassland records are mentioned later, but, in a book of this nature, it is hardly possible to touch more than the fringe of a discussion of what is probably an insoluble problem.

In Part II we are led through simple financial accounting to complete cost accounting. Two functions are claimed for the latter. Firstly, that it will assist the farmer in the long-term planning of the most profitable combination of crops and livestock ; and, secondly, that it will show him how results for particular enterprises compare with those on other farms. It would have been helpful if this first function could have been given more clearly, and the limitations of cost accounting explained in greater detail. These limitations arise from two causes. Firstly, the arbitrary nature of the distribution of overheads, which Mr. Wyllie recognizes but discounts ; and secondly, and more important, the supplementary and complementary nature of many farm enterprises. Direct comparisons of enterprise costs and returns ignore these relationships and fail to take adequate account of the effect of enterprise change on the farm as a whole, although they may give useful indications of the probable results of such change. It is at this stage that Part IV, The Farm Budget, takes its logical place. An essential function of budgeting, although Mr. Wyllie does not say so in so many words, is the comparison of alternative plans for the re-organization of the farm. This provides a means of testing the effect on the farm economy of adjustments suggested by analysis of the records and accounts.

The second function of cost accounting, as stated, is to provide results for individual enterprises which can be compared with those obtained on other farms, thus suggesting opportunities for improvement. Many useful bases of comparison are proffered and a discussion of the merits of these and other measures applicable to the whole farm, is continued in Part III, Efficiency Standards. Mr. Wyllie is rather apologetic for his critical attitude towards these so-called efficiency standards ; but all concerned with their use would be well advised to give considerable attention to his account of their weaknesses and limitations.—A. H. Maunder.

713 Searle, S. A. **The measurement of plant climate.** 1953, pp. 36, bibl. 18, illus., Chichester ; Chichester Press, Ltd., 22 × 14 cm., 4s. 6d.

For the purpose of this work the term plant climate is used to denote climate from the lower limit of the root zone to the top of the vegetation. Plant climate is to a large extent maintained by the temperature of the shallow upper layer of the earth's surface, i.e. to a depth of 1 foot. The factors which control this temperature are discussed ; they are earth temperature, movement of heat in the soil, and some external ones such as precipitation, cloud, sunshine, and air temperature. An instrument for measuring plant climate, known as the "Birdham" plant-climate thermometer, is described. It enables direct readings to be obtained of the stage that has been reached at any time in the normal yearly cycle of earth temperature. A practical example of its use is given, based on the unusually cold winter of 1952/3. In an appendix, maps showing the average mean earth temperature for the British Isles at a depth of 12 in. under grass and reduced to sea-level are presented for each month of the year.—D. Brown.

714 Fritsch, F. E. and Salisbury, E. J. **Plant form and function.** 2nd edn., 1953, pp. 681, illus., London ; Bell and Son, Ltd., 22 × 14 cm.

This is a revised edition of the book first published in 1938. It covers the cytology, morphology, anatomy, physiology, reproduction and ecology of flowering plants; and the several phyla of cryptogams are studied chapter by chapter. As in previous books under this joint authorship, ecology receives generous treatment. The revision of the earlier edition is chiefly evident by bringing up to date the sections on photosynthesis and respiration and by adding a few paragraphs on viruses which are combined with the previous ones on bacteria to make a new chapter. The pagination has been kept parallel with the previous edition by the device of modifying the page numbers with lettering. The book is suitable for Intermediate Science and for Sixth Form work.—D. Brown.

715 Belgian Congo. Institut National pour l'Étude Agronomique du Congo Belge [INÉAC]. Flore du Congo belge et du Ruanda-Urundi. Spermatophytes. Vol. 4. [**Flora of the Belgian Congo and Ruanda-Urundi. Spermatophytes. Vol. 4.**] 1953, pp. 314, illus., Bruxelles ; 25 × 16 cm., 300 fr.

[See *Fld Crop Abstr.* 6 : 1179.] The fourth volume of this botanical work deals with 4 tribes of the Papilionatae : Sophoreae, Genisteae, Trifolieae and Loteae. Each chapter includes descriptions of the genera and species, as well as keys to the identification of subordinate groups and notes on distribution, habitat, etc. The major part of the book consists of descriptions of 189 species of *Crotalaria*. There are indexes of scientific terms and of vernacular names.—E. B. Owen.

716 Correll, D. S. **Section Tuberarium of the genus *Solanum* of North America and Central America.** 1952, pp. 243, bibl. 35, illus., Washington ; Govt Print. Office, 23 × 15 cm., $1·50.

This monograph presents a description and classification of over 50 species and varieties in the section Tuberarium of the genus *Solanum*, found in North and Central America. Taxonomic difficulties in dealing with the genus are discussed, with particular reference to the morphological differences between plants of the same species grown under conditions of different day lengths and temperatures. In view of these differences, the species are treated broadly and are illustrated, in many cases from herbarium and other specimens, so as to show variations in form.—P. J. Boyle.

717† Bärner, J. [Ed.] Bibliographie der Pflanzenschutz-literatur. [**Bibliography of plant protection. Vol. 1 and 2.**] pp. xlviii + 1308, Berlin ; Verlag Paul Parey, 1953, 27 × 19 cm.

This comprehensive bibliography is claimed to include all publications on phytopathology, including those on field crops and grasses, for the years 1940-5. Titles, introductions, and chapter headings are printed in German, English and French. The volumes are divided into the following sections : foreword and introduction ; list of contents ; a general part, which lists a number of collective works and textbooks ; reports of activity and congresses ; diseases and their causes ; measures of plant protection ; author index. The paper and printing are of high quality and the subject-matter is set out clearly in Roman print.—M. Akenhead.

718 Quenouille, M. H. **The design and analysis of experiment.** 1953, pp. xiii + 356, bibl. 178, London ; Charles Griffin and Co., Ltd., 23 × 15 cm., 36s.

An experiment may easily give biased, inaccurate, or suspicious results unless designed and analysed by a statistically appropriate method. An appreciation of the principles of the design and analysis of experiment is therefore an essential preliminary to successful and effective research. This book provides a comprehensive and detailed account of the available methods. It is conveniently divided into four sections dealing in turn with elementary designs, advanced designs, long-term policy, and special problems.

## REPORTS

*The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.*

719 **France.** Institut de Recherches du Coton et des Textiles Exotiques. Activité de l'IRCT. Année 1952. [**The work of the IRCT during 1952.**] *Cot. et Fibr. trop.* 1953, **8,** No. 1, 3-148, illus.

Investigations on cotton and other fibre crops are reported from the Centre of Technology in France and from various stations in French Equatorial Africa, West Africa, North Africa and Madagascar :
1. Retting, p. 10. The new pectinolytic enzyme C8 was found to be more effective than *Clostridium corallinum* for retting hemp, *Urena lobata*, *Hibiscus cannabinus*, flax, etc.
2. Cotton, sowing date. In variety trials at the Bambari Station, Equat. Africa, during 1948-52, higher yields were obtained from sowing at the end of June than at the end of July, pp. 20-1. At the Tadla Station, Morocco, significantly higher yields were obtained from sowing on 20 March, the earliest date tested, than from later sowing dates, pp. 123-4.
3. Cotton, plant density. At the Bebedjia Station, Equat. Africa, on poor soil, the spacing of 60 × 20 cm., corresponding to 80,000 plants per ha., gave the best results, pp. 69-70. At the Tadla Station, a density of 100,000 plants per ha. gave significantly higher yields than other densities tested, pp. 122-3.
4. Cotton varieties. In the region of the Bambari Station, the variety Banda gave satisfactory results over several years, when compared with the local variety Triumph, pp. 19-20. In the region of the Bossangoa Station, Equat. Africa, NK 42-5 and Samaru were the best varieties, pp. 43-4. In the region of the Tikem Station, Equat. Africa, the variety A 49 T gave the best results, p. 50. In the

region of the M'Pesoba-Koutiala Station, Sudan, the variety A 49 T was superior to the local variety, Allen, p. 106. At the Tadla Station, Ashmouni yielded significantly more than other varieties tested, but Pima 67 was the best of the long-linted varieties, pp. 119-20. In the irrigated zone of western Algeria, Karnak was almost the only variety grown, p. 137. In the non-irrigated region of Bona, Algeria, the variety Acala was grown, p. 139.

5. *Urena lobata*, sowing rate, p. 75. At the Madingou Station, Equat. Africa, the optimum sowing rate was found to lie between 30 and 50 kg./ha.—E.B.O.

720 **Netherlands.** Centraal Instituut voor Landbouwkundig Onderzoek. Verslag over 1952. [Report of the Central Institute of Agricultural Research during 1952.] Wageningen, 1953, pp. 224, English summaries.

INVESTIGATIONS REPORTED

1. The growth of spring wheat, oats and barley By W. H. van Dobben, pp. 126-30. The growth of these cereals is compared with reference to their reactions to the length of the photoperiod in the Netherlands.
2. Soil type and crop rotation. By J. C. Pape, pp. 130-6. The choice of crops and rotations in selected areas in Drente Province were considered in relation to soil type. It was found that the degree of availability of moisture in the soil determined to a large extent the choice of crops.
3. Spacing and population studies with hybrid maize. By W. R. Becker, pp. 139-43. [See Abs. 425.]
4. Results of variety and cultivation trials with flax. By J. C. Friederich, pp. 143-7. A number of varieties were tested, with Concurrent as the standard, for yields of straw and seed, and for length, quality and content of fibre. Formosa and Diana gave the best yields of straw. TMTD is recommended for seed disinfection at the rate of 3-5 g. per kg. of flax seed. TMTD is not effective against root rot (*Phoma* sp.) of flax. [See *Fld Crop Abstr.* 6 : 829.]
5. Chemical weed control in flax and linseed. By J. C. Friederich, pp. 147-9.
6. The occurrence of some weeds of arable land in relation to sowing date and soil structure. By P. Riepma Kzn, pp. 157-61. [See Abs. 642.]
7. The trend of vernalization of six winter wheat varieties sown in November in the field. By H. G. Wittenrood, pp. 161-70. The length of the period of low temperature and short photoperiods required by the winter wheat varieties Bersée, Renfort, Prima, Juliana, Carsten's V and Skandia III was estimated.
8. Investigations concerning size and shape of blocks and plots using the data of 2 blank experiments. By C. Lugt, pp. 195-208. The arrangement of blocks and plots so as to minimize the experimental errors caused by fertility differences is discussed.—W.J.B.

721 **Netherlands.** Nationaal Comité voor Brouwgerst. 17de Jaarboekje. [17th yearbook of the National Committee for Malting Barley, 1953.] Rotterdam, 1953, pp. 118, English summary enclosed pp. 7.

INVESTIGATIONS REPORTED :

1. The identification of barley varieties from threshed grain. By F. E. Nijdam, pp. 28-44. The identification of barley varieties grown in the Netherlands by morphological characteristics is described.
2. The control of brown rust (*Puccinia simplex*) in spring barley. By W. Wilten, pp. 72-9. Winter barley is an important source of brown rust contamination to spring barley. Growers of spring barley on plots adjacent to winter barley are recommended to spray a border strip of the spring barley, 100 m. wide, with 0·25% Dithane Z 78 or 0·23% A Aphytora at a rate of 1000 l. per ha. [See *Fld Crop Abstr.* 6 : 831.]
3. Field trials with spring barley varieties in 1952. By W. Wilten, pp. 88-95. Trials at 4 centres in S.W. Netherlands, with Balder as the standard, are reported. On the average, Piroline (Heine 505) gave the highest yields of grain. Piroline also yielded a higher percentage of grain for malting than other varieties. Piroline had a satisfactory resistance to mildew but Carlsberg and Balder were heavily attacked. The last two varieties were more resistant than Piroline to loose smut.
4. The malting quality of Balder, Kenia, Piroline (Heine 505) and Herta. By A. T. Kortenhorst, pp. 83-7. Piroline, now recommended as a malting variety, was compared with other barleys. The malting quality of Piroline was not inferior to that of Balder and Kenia. The grain of Piroline was larger and had a greater 1000-grain weight than the other varieties tested.
5. Yields, statistics and characters of barley varieties. By W. Wilten, pp. 96-106. Details are given of comparative yield trials of spring-barley varieties in 5 different regions in the Netherlands. Frisia (a fodder barley) and Piroline gave the highest yields of grain on the average (90% more than Balder).—W.J.B.

722 EMPIRE COTTON GROWING CORPORATION. Progress reports from Experiment Stations. Season 1952-53. Aden Protectorate. London, 1953, pp. 8.

INVESTIGATIONS REPORTED :

1. Cotton varietal tests, pp. 3 and 5. Of varieties tested to date, X1730 types seem best suited to Abyan conditions.
2. Sorghum varietal tests, p. 5. Of 5 varieties tested, Dwarf Hegari gave the highest grain yields.

3. Pigeon pea (*Cajanus indicus*) varietal trials, p. 6. Two varieties, West Indian white-seeded and Central Indian red-seeded gave yields of shelled peas of 4599 lb. and 6375 lb. per acre, respectively. —M.A.

723 Empire Cotton Growing Corporation. Progress reports from Experiment Stations. Season 1952-3. Anglo-Egyptian Sudan. London, 1953, pp. 21.

Standard variety trials, pp. 5-7 and 19-21. In randomized block experiments laid down at Turabi, at the Gezira Research Farm and at Hag Abdulla, all L types gave higher lint yields per acre than S types, with Wilds intermediate between the 2 groups. At Habeila, Talodi, Lagowa and Kadugli, BAR 7/8 material outyielded BAR SP84 and Pump Scheme Strain in lint yield per acre.—M.A.

724 Empire Cotton Growing Corporation. Progress reports from Experiment Stations. Season 1952-3. Cotton Research Station, Namulonge, Uganda. London, 1953, pp. 34, bibl. 6, illus.

Investigations reported:

1. Cotton cultivation trial. By A. N. Prentice, p. 10. Cotton planted late after maize on tied ridges yielded more seed cotton per acre when maize stalks were used as a furrow mulch than when no mulch was used.
2. Cotton sowing-date trial. By R. H. Prentice, pp. 11-12. Further evidence was obtained that cotton yields dropped markedly the later the sowing date.
3. Plant physiology. By H. G. Fairbrother, pp. 15-22. A comparison of the growth rate, in terms of log. oven dry wt., of cotton planted early in June 1951 and 1952 is given. Rate of bud production and cumulative bud production for the two seasons are shown and bud shedding at the "matchhead size" stage appeared to be related to the internode length of sympodia and secondary sympodia.
4. Lint physiology, By J. P. Evenson, pp. 22-4. Investigation into the susceptibility of strains to seed-coat nep has shown that the weak zone of the chalazal cap which gives rise to seed-coat neps also produces the most immature hair on the seed.—M.A.

725 Empire Cotton Growing Corporation. Progress reports from Experiment Stations. Season 1952-3. Kenya. London, 1953, pp. 7.

Investigations reported:

1. Cotton variety and strain trials, pp. 4-5. At 4 centres in Nyanza Province it was shown that, where planting was early, Uk 48 compared favourably with other varieties and strains.
2. Cotton plant spacing experiment, p. 6. At Homa Bay spacing of UK 48 at 3′ × 3′ and 3′ × 4′ significantly reduced yields of seed cotton in lb. per acre compared with 3′ × 2′ spacing.
3. Cotton cultivation trials, p. 6. At Kibos, ridge cultivations with ties gave higher yields than normal flat cultivation.—M.A.

726 Empire Cotton Growing Corporation. Progress reports from Experimental Stations Season 1951-2. Tanganyika Territory, Eastern Province. London, 1953, pp. 15, illus.

In the cotton strain trials carried out in 1951, the newer introduced strains, and particularly 47/10, which was outstanding for lint quality, were much superior to the Local strain.—M.A.

727 Empire Cotton Growing Corporation. Progress reports from Experiment Stations. Season 1952-3. Nyasaland. London, 1953, pp. 9, illus.

Cotton varietal trials. By H. C. Ducker and R. Smith, pp. 3-4. In comparison with CLB and 5 other East African varieties, CL20 gave the highest yields of seed cotton per acre at 4 out of 6 experimental centres.—M.A.

728 **Sudan.** Research Division of the Ministry of Agriculture. Annual Report for 1949/1950. 1952, pp. 141. [Received 1953]

Investigations reported:

1. Fallow hoeing experiments, p. 22. Increases of 1 kantar of seed cotton per feddan [1 kantar=315 rotls., 1 rotl = 0·99 lb., 1 feddan=1·038 ac.] resulted from hoeing the 1948 fallows before sowing cotton.
2. Grade experiments, p. 28. At the Research Farm, 96 × 1730A cotton plants were marked and picked by zones. Each zone consisted of main-stem nodes and their sympodia. In all cases the upper zones bore the highest proportion of low-grade cotton.
3. Lubia [*Dolichos lablab*] in rotation experiments, pp. 33-4. In the 3-course rotation trial, the cotton-lubia-fallow rotation gave a yield of 22,801 rotls of lubia fodder per feddan.
4. Control of seid grass (*Cyperus rotundus*) experiment, pp. 41-2. Deep ploughing (13·5-14 in.) followed by shallow ploughing was carried out in April and August 1949, respectively, against seid grass. The above-ground incidence of seid was so reduced as to provide a striking contrast with surrounding unploughed land.
5. Control of water weeds, pp. 42-3. Fernoxone powder (80% 2,4-D) mixed with silt and powdered slaked lime, and Methoxone (MCPA) supplied as a 5% dusting powder were added to canal water to give 10 ppm. active agent in each of 12 experimental canals at Darwish, in May 1949, for the control of *Potamogeton nodosus*, *P. perfoliatus* and *Najus pectinatus*. Four weeks after treatment no

floating weeds could be detected and the canal bottoms were overlaid with a fine black mud derived from the decomposition of these weeds.

6. Weed observations on the Sudan Plantations Syndicate Ltd. and the Kassala Cotton Company Ltd. long-term fallow hoeing experiment, pp. 43-5. The residual effect of weeding in 1946 was assessed, by means of weed counts, on fallows following fallow, cotton and lubia. As a result of previous weedings all weeds were found to be reduced in numbers per sq. metre. The difference in favour of weeded and unweeded fields depended on whether the rainfall in the respective years was favourable to weed growth or not.

7. Plant propagation, pp. 73-80. At the Cotton Breeding Station, Dwarf White Milo dura [*Sorghum vulgare*] was propagated over an area of 16 feddans, it matured evenly in 100 days at a uniform height of 5 ft. and was free of the undesirable pendent head and lodging characters. Of sunflower varieties tested, Saratov ECR/623 was the most outstanding with uniform, well-filled heads maturing in 80 days at a height of 4 ft.; it yielded at the rate of 1300 r.p.f. Of 15 varieties of groundnuts tested, Beladi (Native) Bunch ECR/419 yielded 1600 r.p.f. unshelled.

8. Experiments at the mechanized crop production scheme, Ghadambaliya, pp. 112-18. In presowing discing trials on dura, fallow discing during the rains combined with November discing gave a very significant increase in yield. Fernoxone at strengths of from 1·5 to 2·5 rotls per feddan were sprayed 18 days after the sowing of dura and a considerable reduction in weeds was observed, at all concentrations, 17 days after spraying. No scorching of dura leaves or other damage was caused.

9. Watering and ponding experiments at Semeih, pp. 119-25. Land ponded for 10 days prior to early and late sowing of cotton was the most successful of 9 treatments carried out to test the effect of added water on the crop.

10. Hemp and jute observation plots, p. 126. Deccan hemp (*Hibiscus cannabinus*) gave a much higher yield of, and a longer fibre than, *Corchorus capsularis* or *C. olitorius*.

11. Oil content of cotton seed, p. 134. Seed samples from the Nzara ginneries in the 1948-9 season, gave oil percentages of from 17·6 to 18·3 with germination capacities 57-74% for grade 1 seed ; a grade 3 sample with 45% germination gave only 12·8% oil.—M.A.

729 **Kenya** Department of Agriculture. Annual Report for 1950. Vol. 1 and 2. Nairobi, 1952, pp. 38 and 186.

[See *Fld Crop Abstr.* 5 : 672.] Vol. 1 is an economic review of the year's agriculture. Vol. 2 covers experimental work by the research departments. The page numbers below refer to Vol. 2.

INVESTIGATIONS REPORTED :

1. Release of new wheats, p. 96. Six new wheat varieties were released to farmers for planting in 1951 : Nos. 360.H, 337.BE. 2.F.2, 338.AA.1.A.2, 184. P.2.A.1.A, 350. AD.9.C.2. and 341.F.2D.1

2. Barley yield trials, pp. 104-6. The Australian two-row barley, Research, continued to yield well and proved resistant to yellow ear rust as high as 9000 ft. a.s.l.

3. Soyabean variety trials, pp. 107-8. No variety has yet been found which offers economic possibilities for large-scale production..

4. Maize trials, p. 110. In two yield trials at Njoro, open-pollinated Njoro Field Selected Flat White maize gave considerably higher yields than a Southern Rhodesian double-cross hybrid.

5. Wheat rate of seeding trials, pp. 112-14. Numerous trials again showed that there was little difference in yields of wheat over a wide range of sowing rates. Observations showed, as in previous trials, that heavier seed rates promoted earlier ripening.

6. Sunflower variety trials, p. 118. At Ol Joro Orok, the semi-dwarf variety Mars, at a spacing of 18 in. between rows and 8 in. within rows, outyielded Giant Black, Jupiter and Pole Star. Trials carried out at Njoro, Rongai and Ol Joro Orok show that the semi-dwarf varieties can yield as highly as, or outyield, Giant Black, provided the spacing is reduced to give considerably more plants per acre to compensate for the smaller individual size and yield.—M.A.

730 **Southern Rhodesia.** Research and Specialist Services. Annual Report of the Director for the year ending 30 September, 1952. Salisbury, 1953, pp. 41.

[See also *Fld Crop Abstr.* 6 : 437.]

INVESTIGATIONS REPORTED :

1. Velvet beans [*Mucuna deeringianum*] manurial trials, p. 27. At the Grassland Research Station, hay yields of beans were increased from 1080 to 1360 lb. per ac. by an application of 300 lb. ammonium sulphate per ac.

2. Sorghum varietal trials and silage yield, spacing and manurial trials, p. 30. At Matopos Research Station, Early Hegari and Feterita were the highest yielders of 24 commercial sorghum varieties tested and were also among the first 6 resistant to bird and stalk-borer damage. Of 12 silage varieties tested, Napier Fodder [*Pennisetum typhoideum*] gave the highest yields, 25 tons and 12·2 tons per acre on clay and sandveld soils, respectively. With 23 in. rainfall, close spacing 1·3 ft. × 3 in. gave the highest yields. Applications of 200 lb. ammonium sulphate per ac. proved the most economically effective dosage of N.

3. Maize and other crop varietal trials, pp. 30-1. Of 12 yellow and white maize varieties tested at Matopos, Golden Beauty gave the highest yield, 3417 lb. grain per ac. Comparison of 5 green-

manure crops showed sunnhemp to yield best on clay soils and Somerset velvet beans on sandveld. Observation plots of 84 wheat lines under irrigation showed that Warigo, B256 and DITL 122 were superior to the rest in baking tests and were among the top 12 for yield, resistance to disease and lodging.—M.A.

731 **Madagascar.** Inspection Générale des Services Agricoles. Recherche agronomique de Madagascar. No. 1. Compte rendu 1952. [Agronomic research in Madagascar. No. 1. Report for 1952.] n.d., pp. 104, illus.

Investigations are reported from various agricultural stations, amongst them the Lake Alaotra station (for fundamental research) and the Marovoay station (for rice) :

1. Soil improvement, pp. 7-37. *Lupinus angustifolius*, *Dolichos lablab*, *Glycine soja*, *Vigna sinensis* and *Phaseolus lunatus* are recommended for green manure.
2. Rice improvement, pp. 40-8. Trials of plant density after transplanting, in which the plant number varied from 9 to 300 per sq. m., indicated that the grain and straw yield increased with increasing densities up to 100-200 plants per sq. m. In trials of seed density in direct sowing, the highest grain and straw yields were obtained from seed rates of 100-120 kg./ha. Trials to study the fracturing of rice grains showed that the percentage of fractured grains was 10·2 when irrigation was stopped immediately after flowering, 10·6 when it was stopped 10 days after flowering, 11·6 when it was stopped 20 days after flowering and 21·2 when irrigation was continued until the 35th day after flowering.
3. Cassava varieties, pp. 49-52.
4. Groundnuts, pp. 53-4. The oil contents of the principal varieties grown at Alaotra are given.
5. Weeds of rice and groundnuts, the weed *Acanthospermum hispidum* in maize ; control measures, pp. 101-4. Trials to test Chloroxone 80, Weedone 402 and Herbogil showed that these preparations gave good control of *A. hispidum*, which is harmful in maize silage. Treatment with Chloroxone 80 (sodium salt of 2,4-D) containing 80% of the acid of 2,4-D, applied as spray at the rate of 1 kg. of acid per ha., was cheaper than the other 2 preparations. Chloroxone 80, while controlling *A. hispidum*, did not affect maize or *Eleusine indica*, the second important maize weed, which, however, is harmless in silage.—E.B.O.

732 **Belgian Congo.** Institut National pour l'Étude Agronomique du Congo Belge. Rapport annuel pour l'exercice 1952. [Annual Report for 1952.] Gembloux, 1953, pp. 395, bibl. 74, map.

INVESTIGATIONS REPORTED :

1. Cassava. Seed treatment. The highest germination percentage (44%) was obtained by soaking the seeds in 10% hydrogen peroxide for 9 hr., compared with 37 and 31% germination from untreated seed with and without caruncle, respectively, p. 68. In varietal trials carried out at the Mulungu-Tshibinda Station, Kivu, since 1948, the bitter variety N'Tolili yielded more than other varieties tested, pp. 333-4.
2. Soyabean. In a varietal trial at the Keyberg Station, Katanga, the variety Otootan gave the highest yields, p. 305.
3. Sweet potato. In varietal trials at the Mulungu-Tshibinda Station, Kivu, the varieties 5237, Virovsky, Caroline Lea and M 46 gave the highest yields, pp. 331-2.
4. Maize. At the Lubarika Station, the closest spacing tested, 1 × 0·30 m., gave the highest yields, p. 296.
5. *Urena lobata*. Decortication of the seed (achenes) appeared to improve their germination percentage, p. 202. The seed rates of 75 and 85 kg. per ha. gave higher yields of defoliated green matter than the rate of 65 kg., p. 202.
6. Beans (*Phaseolus* sp.). In varietal trials carried out at the Mulungu-Tshibinda Station, Kivu, since 1949, the varieties Wulma and Ibundu gave the highest yields, p. 332.
7. Millet (*Pennisetum typhoideum*). Close spacings, 0·20 × 0·30 and 0·20 × 0·40 m., were best on poor plateau soil, Kwango district, p. 285.
8. *Voandzeia subterranea*. In a varietal trial on plateau soil, the variety Kahemba yielded best, p. 287.
9. *Eleusine* sp. At the Nioka Station, Ituri, there was a significant advantage from sowing along rows 30 cm. apart at the rate of 30 kg. of seed per ha., over other sowing methods tested, p. 347.—E.B.O.

733 **Gold Coast** Department of Agriculture. Annual Report for the year 1951-2. Accra, 1953, pp. 25, 2s. 6d.

INVESTIGATIONS REPORTED :

1. Rice observation and cultural trials, p. 8. At Aiyinasi, Sierra Leone D99 yielded at the rate of 1655 lb. paddy per ac. and was superior to the local Bagulam variety and to Guiana 79. Continuous cropping of rice at Esiama after 6 years has not led to a decline of yields and, here, establishment of rice by broadcasting has proved superior to transplanting.
2. Weed control, p. 9. In the North Ashanti savannah areas, a very good control of lalang grass [*Imperata cylindrica*] was achieved by disc ploughing followed by 6 cultivations ; disc ploughing proved superior to mould-board ploughing. At Asuansi, control of *Acanthospermum hispidum*, *Amaranthus spinosus* and *Bidens pilosus* was effected economically by use of Agroxone 3.—M.A.

734 **Australia.** Queensland Department of Agri-

culture and Stock. Annual Report for the year 1952-53. Brisbane, 1953, pp. 118, illus.

INVESTIGATIONS REPORTED:

1. BVH-4709, an oat variety resistant to crown rust and Victoria blight. By D. O. Atherton, p. 44.
2. A comparison of cold-stored and imported potato seed. By D. O. Atherton, p. 45. Seed potatoes imported from other States (Tasmania and Victoria) consistently outyielded local seed potatoes kept in cold stores. [cf. Argentina results, Abs. 739 of this issue.]
3. A comparison of cut and whole potato setts. By D. O. Atherton, p. 45. Whole setts gave a higher average yield (6·9 tons per ac.) than did cut setts, which yielded 5·2 tons per ac.—W.J.B.

735 **South Australia.** Waite Agricultural Research Institute and associated activities of the Commonwealth Scientific and Industrial Research Organization. Report for 1950-1. Adelaide, 1953, pp. 62. [Received 1954]

INVESTIGATIONS REPORTED:

1. Permanent rotation experiment, p. 4. Results up to 1948 were reported in *Fld Crop Abstr.* 4 : 596. Leys of up to 4 years' duration are now included in the experiment.
2. Forage crops and temporary pasture in 4-course rotations with wheat, pp. 4-5. The value of different forage crops (peas and oats) and pasture (Wimmera ryegrass) for maintaining soil fertility was studied over the period 1937-51. The yields of ryegrass were greater after peas than after oats. The soil fertility, as judged by wheat production, was more favourably influenced by the rotation fallow/wheat/peas/pasture than by fallow/wheat/oats/pasture or fallow/wheat/fallow/wheat.
3. Influence of pastures and forage crops on the yield of wheat grown in rotations of varying duration, pp. 5-6.—W.J.B.

736† **New Zealand.** Department of Census and Statistics. The Official Yearbook, 1953. Fifty-eighth issue. Wellington, 1953, pp. xxxi + 1072, 15s. [Received 1954]

This work contains information on agriculture and pastoral production (pp. 405-72), in which is incorporated a section describing the organization of research carried out by the Department of Agriculture and by the Department of Scientific and Industrial Research. A table gives a classification of the farm holdings by type, evolved for use in 1949/50, and provisional figures are presented of the number of holdings of various types (grazing, dairying, sheep farming, arable cropping, mixed farming, etc.) in the several land districts (North and South Islands separately). The areas under each of the principal field crops for the last 5 years are also tabulated, and there are the usual detailed statistics of: agricultural produce consumed locally, and exported; grass farming income; price index numbers.—M.H.

737 **Illinois** Agricultural Experiment Station. Research progress. Report for 1950-1952. 1953, pp. 134.

INVESTIGATIONS REPORTED:

1. Some effects of certain plant growth substances and carbonic and thiocarbonic acid derivatives of hydrazine on maize. By H. W. Gausman, pp. 43-4. [See Abs. 442.]
2. The response of certain early, mid-season and late maize hybrids to date-of-sowing at three locations in Illinois. By W. E. Kennedy, pp. 44-5.
3. The influence of uppermost axillary shoots and plant growth substances on the development of the lower axillary shoots of dent maize. By J. C. Lyons, p. 45. Upper ear-forming shoots on maize plants inhibited the development of shoots lower on the stem. The upper 3 shoots of a 3-eared single maize cross had a much higher content of growth substances than lower axillary shoots. An active, as well as inactive, form of growth substance was present. The inactive form changed to the active form after pollination.
4. Effects of artificial hail on soyabeans. By J. C. Neill, p. 46. Greatest yield reductions following simulated hail injury were caused when plants were injured at the early-podding stage. Terminal bud losses could be used to evaluate yield reductions caused by hail injury.
5. Relation of leaf analysis of the maize plant to yield and chemical composition of the grain. By R. M. Reed, pp. 46-7. Relations between the yield of mature grain and the percentages of different elements in maize leaves was, in most cases, good. The closest relationship was found between leaf N and grain yield.
6. Studies in earliness in *Avena sativa*. By W. M. Ross. [See Abs. 404.]
7. Foliar spray as a means of providing mineral nutrition for certain agronomic crops. By R. D. Hanck, p. 50. Maize leaves absorbed foliar sprays of N, P, K, Mg and Fe in small amounts. Foliar spraying with urea increased the N content of the grain of wheat and maize.—P.J.B.

738 **Florida** Agricultural Experiment Station. Annual Report for the fiscal year ending June 30, 1952. Gainesville, [n.d.], pp. 310. [Received 1954]

Determination of optimum air delivery, air temperature and depth of seed for mechanical drying. By J. M. Myers and F. Rogers, pp. 50-2. [See Abs. 492.]

Groundnut improvement. By W. A. Carver and others, p. 53. Over a period of at least 3 years, Dixie

Runner, Early Runner and Florida 334 A gave respective yields 22, 26 and 52% higher than those of Common Runner.—P.J.B.

739 **Argentina.** Memoria de la Primera Reunion de Papa. [Proceedings of the First Potato Conference.] Pergamino, 1952, pp. 75. [Received 1954]

The First Potato Conference was held at Balcarce Exp. Sta., Province of Buenos Aires, in October 1952. The following were among the papers read :
1. Performance, in south-east Buenos Aires, of seed potatoes obtained from the Rosario region. By C. J. Induni pp. 5-7. An experiment carried out at Balcarce in 1951 showed that seed potatoes of the varieties Katahdin and Sebago imported from the Rosario region gave better yields than locally grown seed potatoes. In general the percentage of virus was higher in the seed from the Rosario region than in the local seed and was higher in seed potatoes from the interior than in those from the coastal area of the Rosario region.
2. Planting dates for potatoes at Balcarce. By J. E. Dozo and E. van Gool, pp. 9-10.
3. Spacing of seed potatoes to give maximum yields. By J. E. Dozo, pp. 11-13.
4. The value of conserving Katahdin seed potatoes in cold stores. By J. E. Dozo, pp. 19-22. In experiments carried out in 1949-52 the behaviour and yield of seed potatoes stored in clamps and of others kept in cold stores up to planting time, were compared. On an average, seed potatoes kept in cold stores yielded 5488 kg. per ha. more than clamped seed. The difference in yield was the result of a relatively low number of failures among the seed from cold stores [cf. Queensland results, Abs. 734 of this issue].
5. Losses during storage of the varieties Katahdin and Huinkul M.A. by D. A. Garay, pp. 23-4.
6. Improvement of varieties at Balcarce. By D. R. Pasquale and others. The breeding of strains suitable for the various agroclimatic regions of Argentina and for resistance to the prevalent diseases of the country, is discussed.
7. Fusarium wilt of potatoes. By A. V. Calderoni, pp. 43-50. In the Balcarce area it was not found possible to reduce the incidence of the disease either by advancing or retarding the date of planting. Disinfection of the seed potatoes with $HgCl_2$ was also ineffective. The varieties Katahdin and Pontiac were resistant to the disease.
8. The degree of resistance of the variety Katahdin to the most common virus diseases. By M. V. Fernandez, pp. 63-4.
9. Resistance to *Streptomyces scabies* of 127 varieties and clones. By A. T. Calderoni and C. J. Induni, pp. 67-70.—W.J.B.

# NEWS ITEMS AND NOTES

**Great Britain.**

740 National Institute of Agricultural Botany, Crop Conference. A meeting was held in Cambridge during 15-16 December, 1953, when papers were given on the theme of " Varieties in relation to crop production " with special reference to barley, sugar-beet and wheat. An account of the proceedings is given in *Nature, Lond.* 30 Jan., 1954.—M.H.

**Germany**

741 The Max Planck Institute. On the 25th anniversary of its foundation, a short account of the Max Planck Institute for Genetical Research, Voldagsen, is given by Hertzsch in *Züchter* 1953, 23, 371. The Institute, originally named the Kaiser Wilhelm Institut für Züchtungsforschung and situated at Müncheberg, Mark, and subsequently known as the Erwin Baur Institute, after its founder and first director, is now called the Max Planck Institute. The fortunes of war having made it necessary to leave the well-equipped station at Müncheberg, Dr. Wilhelm Rudorf, its director since 1936, was able to transfer the most valuable breeding material to Voldagsen, where the Institute now functions with a branch at Scharnhorst near Neustadt a. Rbge. Grasses and practically all crop plants are included in the material under investigation.—G.M.R.

**Netherlands**

742 The Teaching of Tropical Agriculture. There are two main categories of tropical agricultural instruction in the Netherlands : education for the degree of Agricultural Engineer (equivalent to M.Sc.) at the Agricultural University College, Wageningen, and education for practical tropical agriculturalists at the State College for Tropical Agriculture, Deventer, and at a few other agricultural colleges. In addition, post graduate and undergraduate courses in English (or French, if sufficient French speaking students enrol) are given at Wageningen and Deventer, respectively, for the special benefit of foreign students. The course for the degree of Agricultural Engineer lasts five-and-a-half years (including 6 months practical work) and allows the students to specialize in particular studies such as plant breeding, plant pathology, soil science or agricultural economics during the last two years. *Trop. Agric.* 31, No. 1, 1954.—W.J.B.

**Belgium**

743 List of Agricultural Officers. Names and particulars of personnel in the various departments of the Ministry of Agriculture and related Services are contained in a Supplement to Vol. 7, No. 1. of *Rev. Agric. Brux.* Jan., 1954.—D.B.

**Italy**

744 Seed Exchange. Seeds offered in exchange by the Istituto ed Orto Botanico, Università di Torino, include seeds of 1326 species and varieties collected in 1953.—E.B.O.

**Portugal**

745 Seed Exchange. The *Index Seminum* 1954 of the Estação Agronómico Nacional, Sacavém, has special sections devoted to varieites of rice, wheat, soyabean, flax and linseed.—W.J.B.

**Union of South Africa**

746 An Electronic Seed Counter has been devised by the Electronics Division of the National Physical Laboratory. It can count seed of any size at a rate of 600 a minute, correct to within 2%. *CSIR Res. Rev.* 1953, Vol. 3, No. 4.—C.L.S.

**India**

747 Reclamation of Kans-Infested Land. It was estimated a few years ago that 10 million acres of land in Central India, much of it fertile, were infested with kans grass [*Saccharum spontaneum*]. The Indian Government, aided by a loan from the International Bank, is now reclaiming over 200,000 acres of the kans-infested land per year. Kans is killed by deep ploughing to 12-14 in. followed by the exposure of the roots to the sun. *New Commonw.* September, 1953.—W.J.B.

**USSR**

748 Biochemical Research. The following papers are included in *Biohimija* 1953, Vol. 18, No. 1-4 :

1. Klimenko, V. G. Forms of grain nitrogen and protein in *Cicer arietinum*, pp. 12-18 ;
2. Petrova, A. N. and others. Synthesis and distribution of starch in potato tubers at different periods of the plant's vegetation, pp. 47-50 ;
3. Klimenko, V. G. Forms of grain nitrogen and protein in some pea varieties, pp. 141-50 ;
4. Kostrubin, M. V. Pectin substances and hemicelluloses in flax stems, pp. 175-83 ;
5. Zotova, O. N. The effect of growth conditions of the potato on content of vitamin C, pp. 205-9 ;
6. Kostrubin, M. V. Pectin substances and hemicelluloses in hemp stems, pp. 263-70 ;
7. Kurc, F. A. The role of ascorbic acid as a conveyer of hydrogen in plants, pp. 284-7 ;
8. Ščerbakov, A. P. Biochemical changes in the ripening seeds of soyabean under the influence of calcium and magnesium, pp. 438-47 ;
9. Kursanov, A. L. Synthesis of cellulose in cotton fibres, pp. 448-51.—M.H.

# FIELD CROPS

## CEREALS

### WHEAT

749 SIM, J. T. R. and others. **Wheat production in South Africa.** With contributions on **Disease and insect pest control.** By J. J. v. d. Watt, J. H. Nortje, and C. J. Joubert. *Bull. 334.* (*Stellenbosch-Elsenburgh Fmrs' Ser. 226.*) *S. Afr. Dep. Agric.* 1953, pp. 87, bibl. 7, illus., 2s.

750 LOCKE, L. F. and MATHEWS, O. R. **Relation of cultural practices to winter wheat production, Southern Great Plains Field Station, Woodward, Okla.** *Circ. 917. U.S. Dep. Agric.* 1953, pp. 54, illus.

The results are given of trials during 1915-49 on the effect of tillage practices, rotations, manurial treatments and date of sowing on the yield of winter wheat. Time of tillage was the most important factor affecting yields where wheat was grown continuously. Where stubbles were tilled immediately after harvest in late June or early July, grain yields were highest for both rye and winter wheat. Ploughing to a depth of 4 in. gave higher yields than ploughing to a depth of 8 in., listing, or discing. The effect of early tillage on yields was largely due to the control of weeds and volunteer grain secured by this method. Yield differences following ploughing every year, and ploughing every 2-5 years alternating with shallow, one-way ploughing, were small. Delaying sowing by one month, from 9 October to 7 November, reduced yields. Rotating wheat with sorghum significantly reduced wheat yields, compared with wheat grown continuously. Fallowing did not increase the yield reliability of wheat. Wheat yields following fallow were one-third higher than those of wheat grown continuously. Green-manure crops did not raise wheat yields significantly higher than those following fallow. Manurial treatments appeared to be effective only where spring moisture conditions in May were favourable to crop growth.—P.J.B.

751 ECOCHARD, R. Influence de la profondeur du semis sur la croissance et le rendement du blé. [**Effect of sowing depth on the growth and yield of wheat.**] *C. R. Acad. Agric. Fr.* 1953, **39,** No. 16, 765-9, bibl. 5. [Sta. Cent. Génét. Amélior. Pl., Versailles]

The effect upon 3 wheat varieties of sowing at 2, 4, 6 and 8 cm. is under study, and a preliminary report is given. In two of the varieties, the fertility of the ear (number or size of grains) and in the third (Marival) prolific tillering are characteristic and are the factors principally governing yield. Tillering was reduced by deep sowing, but the different phases of the reproductive period were little modified or not at all. The first year's results, although not conclusive, appear to indicate that yield in varieties such as Marival, dependent on tillering, is unfavourably affected by deep sowing (6-8 cm.).—G.M.R.

752 KÖNNECKE, G. Winter- oder Sommerweizen-Aussaat bei später Herbstbestellung. [**Sowing of winter- or spring-wheat with late autumn cultivation.**] *Deutsch. Landw.* 1953, **4,** No. 11, bibl. [Inst. Acker- u. Pflbau, Univ. Halle (Saale), Germany]

Since winter-wheat is the only winter-cereal without a definite final date for sowing, many farmers take advantage of the possibility of late sowing, but seldom with satisfactory yields. From a table of average yields of 7 varieties of winter-wheat sown on several different dates in each of the years 1942-50 it is clear that, despite the very variable weather obtaining over this period, mid-October stands out as the best time for sowing. When sown after mid-November the fall in yield was marked. The important factor influencing yields is the stage in which the plant passes the winter, i.e. as seedling or as established green plant. Those varieties which can be sown late [in Central Germany] are Hadmersleben II (up to mid-December) and Derenburger Silber (up to mid-November). The dividing line between winter- and spring-wheat is, in climatically favourable situations, usually about Christmas. From then until mid-March the best spring-wheat to sow is Peko, which requires a long vegetative period.—D.B.

753 PANDE, H. K. **Effect of weeding on the yield of wheat.** *Emp. J. exp. Agric.* 1953, **21,** No. 84, 297-303, bibl. 8. [Dep. Agron. B. R. Coll., Agra, India]

A series of experiments during 1949-52 is described, in which the influence of weeding wheat on the yield of grain per ac., grain yield per ear and number of ear-bearing tillers per plant was determined. Weeding followed the first irrigation, given to the crop 1 month after sowing. In 1951-2, the effect on the wheat crop of hand-hoeing (the method of weeding used throughout the experiments) was compared with that of pulling the weeds by hand. Weeding, as compared with no weeding, increased the grain yield per ac., the weight of grain per plant and the number of ear-bearing tillers per plant by 24, 47, and 30%, respectively, in 1949-50, by 23, 27 and 33% in 1950-1 and by 28, 86 and 67% in 1951-2; all these increases were significant. There was no significant difference between the effects of hand-hoeing and hand-pulling in 1951-2. The yield per plant showed a greater percentage increase with weeding than did the yield per ac. because weeding reduced the population of wheat plants. In the 1951-2 experiment, when plots with different levels of fertility were compared, the response of the wheat crop to weeding was significantly greater on the infertile than on the fertile plots.—W.J.B.

754 Sibbitt, L. D. and others. **The quality of Selkirk (C.T. 186), a new rust resistant hard red spring wheat.** *Bi-mon. Bull. N. Dak. agric. Exp. Sta.* 1954, **16,** No. 4, 142-5, bibl. 2.

Selkirk was produced from a (McMurachy × Exchange) × Redman cross and is resistant to Race 15B of stem rust. In yield comparisons during 1953, Selkirk gave an average of 32.3 bu. grain per ac., compared with 24·7, 22.9, 17.9, 19 and 17·6 bu. per ac. for Lee, Rushmore, Rival, Thatcher and Mida, respectively. The protein content of Selkirk was 13·9%, compared with 13·2% for Lee, the highest among the remaining varieties. The loaf volume of Selkirk was significantly higher than that of the mean of the other varieties. Compared with Thatcher, Selkirk was not quite as strong a wheat, as indicated by farinogram tracings, but was regarded as satisfactory for a hard, red, spring wheat.—P.J.B.

755 Lovčikov, I. [**New regionalized varieties of hard wheat.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 82-5.

The varieties are Narodnaja and Akmolinka 5. The former was produced by the Harjkov Selection Station from a local, hard spring-wheat. It is medium-early ripening in the Ukraine and the central black-earth belt, with a vegetative period of 78-103 days. During the years 1945-50, Narodnaja gave consistently higher yields than Melanopus 69 in plot trials carried out in the forest/steppe and steppe zones of the Harjkov Province and in the Stalinsk and Nikolaevsk Provinces. Akmolinka 5 was produced by the Šortandinsk Experimental Station. It is medium-early in ripening, with a vegetative period of 81-106 days.—M.H.

756 Didusj, V. I. [**Winter wheat Lutescens 238.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 80-1, illus.

The yields of this variety are compared with those of Hostianum 237 and Odesskaja 3. Average yields obtained from 5 different experimental plots in the Harjkov Province were as follows (in kg./ha.): 4670 from Lutescens 238; 3490 from Hostianum 237; and 4080 from Odesskaja 3.—M.H.

757 Gelin, H. Étude sur les blés cultivés à Port-Laguerre. [**A study of the wheat varieties grown at Port-Laguerre (New Caledonia).**] *Rev. agric. Nouv.-Calédonie* 1953, **4,** No. 7-8, 16-17.

Information is given on the following wheat varieties which gave promising results at the School of Agriculture, Port-Laguerre: Florence Aurore, Pinyte, Indoxa (all 3 from southern Morocco) and Seafoam [provenance not stated].—E.B.O.

758 Netherlands. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 165. Wintervastheid en voorjaarzaai bij wintertarwe, 1954. [**Choice of varieties. Pamphlet No. 165. Winterhardiness and spring-sowing of winter wheat varieties, 1954.**] *Suppl. 13. Landb. Voorl.* 1954, **11,** No. 2, 1-4. [Netherlands]

Twelve varieties of winter wheat grown in the Netherlands are graded according to their degree of winterhardiness as determined by field experiments and by low-temperature tests using artificial refrigeration. Of the varieties mentioned, Minister and Nord Desprez were the least, and Carsten's V and Elisabeth the most, winterhardy. In tests to study the influence of late sowing (in spring) on the plant development and grain weight at harvest of 9 winter-wheat varieties, the varieties Carsten's V and Meine's VII suffered most from late sowing. The decline of the grain weight of these two varieties was most marked when they were sown after 20 Feb.—W.J.B.

759 Mehta, P. R. and others. **Varietal resistance of wheat to loose smut (*Ustilago tritici*).** *Curr. Sci.* 1954, **23,** No. 1, 20-1. [Lab. Pl. Path., Govt U.P., Kanpur, India]

760 Brentzel, W. E. **New treatments for loose smut of wheat.** *Bi-mon. Bull. N. Dak. agric. Exp. Sta.* 1954, **16,** No. 4, 137-8.

The results are given of trials to control loose smut of wheat by soaking the seed in cold water containing the following: (a) Spergon (3 oz. per 10 gal. water), (b) streptomycin (1·5 oz. di-hydro streptomycin sulphate in 10 gal. water), (c) HD109 (1·5 oz. in 10 gal. water; active ingredient not specified). Other seed was soaked in clean water. In all cases the seed was soaked for 32 hr. Average plant emergences following treatments (a), (b) and (c) were 14, 11 and 79; average grain yields were 6·5, 5·9 and 16 bu. per ac. and percentages of loose smut were nil, nil and 0·4, respectively. Average plant emergence, grain yields and loose smut percentages for seed not treated were 100%, 16 bu. per ac., and 12, and, for seed treated with water only, 93%, 16 bu. per ac. and 2, respectively.—P.J.B.

761 Minz, G. and Bental, A. [**Experiments on**

**loose smut in wheat and barley.**] [Hebrew] *Hassadeh* 1952, **33,** No. 2, 113-16.

The indigenous durum wheat Nursit is very susceptible to loose smut (*Ustilago tritici*), although otherwise suitable as winter wheat. In 1947-8, hot-water treatment (10 min. at 53°C. after 4 hr. presoaking) entirely suppressed the smut on an area of 0·5 acre, while there was 5% infection in the check plot. The Tunisian barley variety is susceptible to loose smuts (*U. nuda* and *U. nigra*). In 1950-1, both loose smuts were entirely suppressed by hot-water treatment (5 min. at 49°C., 10 min. at 51·5°C., after 4 hr. presoaking), while there was 1·1% infection in the check plot. A plot sown after Agrosan GN treatment (2 g./kg.) showed 0·7%

*U. nigra* was elimin-

## CORRECTION

Vol. 7, No. 3:

Abs. 758, line 11

For Meine's VII *substitute* Heine's VII.

Edmonton]

Trials have shown that mixtures of Actidione and Orthocide 406 (N-trichloromethylthio tetrahydrophthalimide) have proved superior to either used alone, in terms of control of covered smut of wheat and seedling emergence.—P.J.B.

763 HAYDEN, E. B. and others. **The pathogenicity of races 11, 49, 125 and 139 of *Puccinia graminis tritici* to Kenya wheat varieties and their derivatives.** [Abstract] *Phytopathology* 1953, **43,** No. 9, 474.

Races 11, 49, 125 and 139 of *P. graminis tritici* have attacked seedlings and mature plants of Kenya 58, Kenya 117-A and the Kenya derivatives Kentana 52 and Lerma. These races are widely distributed in the USA and Mexico. Kenya 338 A.A.1.A.2. and Kenya 338 A.C.2.E.2. were resistant to all isolates of these races so far tested.—P.J.B.

764 LIVINGSTON, J. E. **The control of leaf and stem rust of wheat with chemotherapeutants.** *Phytopathology* 1953, **43,** No. 9, 496-9, bibl.7. [Univ. Nebraska, Lincoln]

In field and greenhouse trials in Nebraska, 179 chemicals were tested for the control of *Puccinia rubigo-vera tritici* and *P. graminis tritici*. Calcium sulphamate was the most effective and almost completely prevented the development of leaf and stem rust pustules in the field where it was applied from the air at a rate of 15 lb. per ac. There was no evidence of detrimental effects on the plants following this treatment. In the case of stem rust, weekly or fortnightly aerial applications of 10 lb. calcium sulphate per ac. gave considerably better control at harvest than one treatment of 15 lb. per ac. Calcium sulphamate appeared to cause a slight reduction in the germination of harvested grain; it did not impart lasting immunity to the plants. Actidione appeared to exercise some control of leaf rust and stem rust and imparted a measure of continued immunity against the pathogens. The range of safety between fungicidal effectiveness and phytotoxicity appeared to be low in the case of Actidione.—P.J.B.

765 HOTSON, H. H. **Some chemotherapeutic**
**heat stem rust.** *Phytopathology*
12, 659-62, bibl. 9. [Univ. Fm,
nn.]

. R. **Effect of DDT on the meta-**
**Khapli wheat seedlings.** *Nature,*
**173,** No. 4409, 827, bibl. 2,
Path. Lab., Sci. Serv. Canada
, Winnipeg, Manitoba]

k of Johnson (*Canad. J. Res. Ser.*
ho reported that DDT affected
Khapli wheat so that the seed-
susceptible to a race of *Puccinia graminis* var. *tritici*, the author has attempted to determine the nature of rust resistance. From his tests there is an indication that DDT alters plant metabolism in such a way that free amino-acids and simple sugars accumulate in the leaf. It is anticipated that further study will elucidate the relationship between alteration in metabolism and susceptibility of the plant to infection.—M.H.

767 HÅRDH, J. E. Kevätvehnän kahutähkäisyydestä sekä sen syistä Suomessa. **On the shrivelheads of spring wheat and their causes in Finland.** *Valt. Maatalousk. Julk.* 1953, No. 140, pp. 152, bibl. 217, illus., English summary pp. 129-44. [Dep. Pl. Path., Tikkurila, Finland]

The main purpose of this study is to consider the occurrence of the fungus *Cercosporella herpotrichoides* and the insect *Amblymerus graminum* in fields of spring wheat showing shrivelheads. Control measures are discussed in regard to chemical treatment, the use of fertilizers, varietal resistance, sowing time, crop density and sowing depth, crop rotations and other cultural measures.—M.H.

768 STRZEMSKA, J. Zagadnienie mikoryzy u zböz. [**The mycorrhiza of cereal plants.**] *Acta microbiol. polon.* 1953, **2,** No. 4, 297-306, bibl. 2, illus., English summary p. 302.

The author investigated the occurrence and development of mycorrhiza in wheat and its dependence on the kind of soil and its pH and on the age of the plants. The following species of wheat were studied : *Triticum vulgare*, *T. durum*, *T. dicoccum*, *T. monococcum*, *T. spelta* and *T. polonicum*. More than 450 preparations of root samples have been examined. The main conclusions are : (1) All the species of wheat investigated have an endotrophic mycorrhiza. The most abundant was found in *T. dicoccum* and *T. vulgare*. (2) The intensity of development of the mycorrhiza is independent of the kind of soil and its pH. It increases with the age of plants. (3) The roots that are not infected with mycorrhiza have an irregular shape and the root cells are deformed.—From author's summary.

769 Collier, D. and Gachon, L. De l'influence de différentes conditions de sous-sol sur la végétation et le rendement d'un blé d'hiver en terres noires de Limagne. [**The effect of different subsoil conditions on the growth and yield of a winter wheat in black earths of the Limagne.**] *C. R. Acad. Agric. Fr.* 1954, **40,** No. 3, 134-8.

The growth of a winter wheat was studied in 24 cement cases 2 m. square by 1·6 m. deep, in which the different soil conditions found in the Limagne plain of Clermont-Ferrand were simulated. Farmyard manure was the only fertilizer used. The black earths of the plain vary in depth from 0·3 m. to 2 m. and more, and rest upon a subsoil generally of marl but sometimes of gravel and pebbles, and the water-table varies considerably in depth according to season and periods of drought and moisture. The influence of the different subsoil conditions is traced and their importance indicated.—G.M.R.

770 Gachon, L. and Collier, D. De l'influence de différentes conditions de sous-sol sur l'alimentation minérale, la composition et les exportations d'un blé d'hiver en terres noires de Limagne. [**The effect of different subsoil conditions on the mineral nutrition, the composition and the uptake of a winter wheat in black earths of the Limagne.**] *C. R. Acad. Agric. Fr.* 1954, **40,** No. 3, 138-42, bibl. 5.

From winter wheat grown in a subsoil-case trial already described (Abs. 769), samples were taken on 24 May of the second and third leaves below the ear, the plants in all the cases being then at the same stage of development. Chemical analyses of these leaves, and of the straw and grain of the wheat which reached maturity on 29 July, are tabulated and discussed with special reference to the subsoil conditions. Excessive moisture was found to be the sole physical condition capable of inducing a change in the physiological equilibrium of the plants, the other subsoil conditions only affecting the intensity of nutrition.—G.M.R.

771 Dekker, L. P. van der and Miranda, H. de. **The vitamin $B_1$ content of Dutch wheat and the factors which determine this content.** *Neths J. agric. Sci.* 1954, **2,** No. 1, 27-31, bibl. 10. [Cent. Inst. Nutr. Res. T.N.O., Utrecht]

The vitamin $B_1$ content of the grain of a number of Dutch varieties of winter- and spring-wheats was determined in experiments carried out over a range of soil types in 1946-8. The vitamin $B_1$ content of the grain varied significantly with the variety, soil type and year of sowing in the case of both spring and winter varieties and with the date of sowing in the case of spring varieties only. Among spring varieties, Van Hoek had a relatively high (5·1 μg. per g. in 1947) and Carma a low vitamin $B_1$ content ; among winter varieties Alba had a relatively high (4·4 μg. per g. on sea-clay in 1947), and Carstens V a low, content. Sea-clay always gave a higher vitamin $B_1$ content in the wheat grain than sandy soil. A higher content of vitamin $B_1$ was found in the grain harvested in 1947 (warm summer) than in 1946 and 1948 (poor summers). In the case of spring varieties, a higher vitamin $B_1$ content in the grain was obtained with relatively late, rather than with relatively early, sowing.—W.I.B.

772 Rubin, B. A. and Sokolova, V. E. [**Features of the reaction of respiration to temperature in winter and spring wheat.**] [Russian] *Izv. Akad. Nauk SSSR* (*Bull. Acad. Sci. USSR*) 1954, No. 1, 20-31, bibl. 6. [Bach Biochem. Inst., Acad. Sci., USSR]

773 Coïc, Y. Action de la fertilisation azotée utilisée pour la croissance sur les besoins ultérieurs en azote du blé. Conséquences agronomiques. [**Effect of the nitrogen fertilization utilized for growth on the subsequent nitrogen requirements of wheat. Agronomic consequences.**] *C. R. Acad. Agric. Fr.* 1954, **40,** No. 2, 100-2, bibl. 2.

Moderate and judicious applications of N to tillering wheat, while producing the vegetative growth necessary to obtain good yield, create further N requirements in the plant. [*C. R. Acad. Agric. Fr.* 1949, 79-82. See also *Fld Crop Abstr.* 4 : 324.] The timing of subsequent applications was tested in pot trials of two varieties both of which received N in March, during tillering. Further doses were applied (a) at the end of April (shooting), (b) at the beginning of June (flowering), and (c) at both the end of April and beginning of June. The increase in grain yield was greater under treatment (a) than under (b), but significantly greater under treatment (c) than under (a) (7.7 g. per pot instead of 2.6 g. and 8·8 g. per pot instead of 3·5 g.). The effects on number of grains per pot and mean grain weight were also studied. Among practical conclusions drawn is the finding that by the judicious spacing of doses of N it is now possible to grow, in soils hitherto considered little suitable for such cultures, productive wheat varieties which tiller well.—G.M.R.

774 Coïc, Y. and Jolivet, E. La fertilisation azotée semitardive et tardive du blé d'hiver. I. Action sur le rendement. [**Medium-late and late application of nitrogen to winter wheat. I. Effect on yield.**] *C. R. Acad. Agric. Fr.* 1953, **39,** No. 16, 741-4, bibl. 2. [Inst. Nat. Rech. Agric., France]

In continuation of previous experiments [see *Fld Crop Abstr.* 4 : 324, 963, 964 ; and 6 : 880] 3 winter wheat varieties received 3 nitrogenous treatments in 1951, viz. : I, 50 kg. ammonium nitrate per ha. on 28 February ; II, the same plus 30 kg. nitrochalk at the end of April ; III, the same as II plus 30 kg. nitrochalk at the end of May (on flowering). In 1952, 4 treatments were given : I, 35 kg. ammonium nitrate per ha. on 26 February plus another 35 kg. on 25 March ; II, the same as I plus 50 kg. granulated calcium cyanamide per ha. on 3 April ; III, the same as I plus 25 kg. nitrochalk per ha. on 28 April ; IV, the same as III plus 25 kg. nitrochalk per ha. on 24 May (about flowering). The varieties were Yga, characterized by vigorous tillering, poor ear fertility and a small grain ; Bersée Hybrid, characterized by medium-good tillering, good ear fertility and a medium-sized grain ; and Hybrid 40, characterized by poor tillering, medium-good ear fertility and a large grain. The effects of the different treatments upon the different characters of these wheats and upon total yield are discussed in some detail and in relation to the shallow, very permeable soil and mild, rainy climate of Quimper, in Brittany, where the trials took place. To obtain a good yield in this environment it is necessary to apply, in addition to the N necessary for tillering, further quantities during growth, earing and grain formation, and these may be given in 2 applications, one medium late, at the beginning of growth, and one late, during earing to flowering.—G.M.R.

775 Coïc, Y. and Alexinsky, W. La fertilisation azotée semi-tardive et tardive du blé d'hiver. II Action sur le taux d'azote du grain et sa qualité meunièreboulangère. [**Medium-late and late application of nitrogen to winter wheat. 2. Effect on the nitrogen content of the grain and its milling and baking quality.**] *C. R. Acad. Agric. Fr.* 1953, **39,** No. 17, 782-8, bibl. 5. [Inst. Nat. Rech. Agric., France]

Analysis of the grain grown in wheat manurial trials reported elsewhere [see Abs. 774] shows that the late application of N (April-May) increases the nitrogen content of the grain and thus its gluten content, and results in an improvement of milling and baking quality.—G.M.R.

776 Kurguzov, P. [**The effect of boron on harvests and grain quality of spring wheat.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 71-2.

Tests carried out at the Institute of Grain Husbandry, non-chernozem belt, Nemčinovka, during 1950-2 are reported.—M.H.

777 Lukjjanov, I. [**The effect of organo-mineral fertilizers on yield of winter wheat and *Coriandrum sativum* in the central chernozem belt.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 64-5.

778 National Institute of Agricultural Engineering. **Transfer of moisture from damp to dry wheat in storage.** *Tech. Mem. 71/GD/52. N.I.A.E.* 1953, pp. 6, illus.

In an experiment to investigate, on a laboratory scale, the rate of transfer of moisture from damp to dry wheat, it was found that, with a moisture-content difference between the dry and damp samples of 14%, a rate of drying of over 0.5% per hr. was achieved in the first 12 hr. following intimate mixing. This interchange of moisture may be of value in preventing deterioration of damp wheat provided it can be intimately mixed in suitable proportions with dry wheat.—C.L.S.

## OATS

779 Pendleton, J. W. and Dungan, G. H. **Effect of different oat spacings on growth and yield of oats and red clover.** *Agron. J.* 1953, **45,** No. 9, 442-4, bibl. 4. [Illinois Agric. Exp. Sta., Urbana]

Oats were sown at a rate of 8 pecks per ac. at the following row spacings : (a) 8 in., (b) 16 in., (c) 24 in., (d) 2 rows 8 in. apart, with 16 in. borders each side, (e) 2 rows 4 in. apart with 16 in. borders each side and (f) broadcast at a rate of 10 pecks per ac. Red clover [*Trifolium pratense*] was sown at right angles to the rows of oats at a rate of 10 lb. per ac. in rows 4 in. apart. Mean grain yields of oats over a 3-year period for row spacings (a), (b), (c), (d), (e) and (f) were 67·9, 56·6, 43·6, 61·5, 61·5 and 61·6, bu. per ac., respectively. The height of the oat plants and the number of tillers increased as row widths increased. Grain from rows 8 in. apart averaged 1·8 lb. more in bushel weight than grain from rows 24 in. apart. In seasons where rainfall was normal, or above average, there were no significant differences between clover stands at the different oat-row spacings. Where rainfall was below average during May and June, there were slightly better clover stands where the wide row spacings between the oats were used. Dry-matter yields of clover during the year with rainfall 2 in. below average during May and June, averaged 2915 lb. where the clover was grown alone and 1857 lb. where it was grown with oats in 24-inch rows ; this latter row spacing resulted in the highest clover yields. The clover was harvested in the September of the year in which it was sown.—P.J.B.

780 Zweifel, J. and Keller, C. Résultats d'essais comparatifs d'avoines d'automne. [**Results of trials of autumn-sown oats.**] *Rev. rom. Agric.* 1954, **10,** No. 2, 9-11, illus. [Sta. Féd. Essais Agric., Lausanne]

Trials were made in western Switzerland from 1949 to 1953 of 5 British and 2 French autumn-sown oat varieties grown at 400-590 m. a.s.l. The Aberystwyth variety S172 and the French variety Prieuré were the most productive and neither tended to lodge, Prieuré being the most hardy of the seven. As, however, even under the most favourable regional conditions, none has proved sufficiently winterhardy or reliable in yield, trial of these varieties is being discontinued.—G.M.R.

781 Nicholson, G. **Oat and barley varieties recommended for 1954 sowings [in N.S.W.].** *Agric. Gaz. N.S.W.* 1953, **64,** Pt. 12, 637-40.

782 Leben, C. and others. **Small grain seed treatment with the antibiotic, Helixin B.** *Phytopathology* 1953, **43,** No. 7, 391-4, bibl. 20. [Univ. Wisconsin, Madison]

The results of greenhouse and field trials with an impure preparation of Helixin B, dissolved in ethanol, showed that it was comparable in many cases with Ceresan M in controlling Helminthosporium blights of oats and barley. Helixin B applied as a dust was ineffective.—P.J.B.

783 Ullmann, W. Über Wildhafer, Kulturhafer und Zwischenformen (insbesondere Fatuoiden) in der Vergangenheit und in der Gegenwart. 2. [**Wild oats, cultivated oats and intermediate forms (fatuoids in particular) in the past and at the present time.**] *Saatgutwirtschaft* 1953, **5,** No. 12, 306-11, bibl. 35, illus. [Kassel-Harleshausen, Germany]

Illustrated keys are presented for the identification of *Avena fatua*, *A. sativa*, *A. sativa* (fatuoid), intermediate forms, *A. barbata*, *A. strigosa*, *A. brevis*. *A. sterilis* var. *maxima*, *A. sterilis* var. *ludoviciana*, *A. byzantina* and *A. abyssinica*.—G.M.R.

## RYE

784 Purvis, Olive N. **The physiology of flower differentiation in grasses.** *Proc. 6th Internat. Grassld Congr. 1952* 1953, 661-6, bibl. 3. [Pl. Physiol. and Technol. Res. Inst., Imp. Coll. Sci., London]

Observations are made on floral induction in Petkus rye. Data are presented of the response of winter rye to different photoperiodic treatments, which showed that flowering was promoted both by short-day and continuous-day treatments ; in the case of short-day treatments, this held good only where the treatment was not prolonged beyond 6 weeks after sowing and was succeeded by long day lengths, or continuous light. These treatments did not result, however, in earliness similar to that of spring rye. There was evidence that floral initiation was accelerated by short days, but that continuous daylight was the optimum condition for continued floral development. Vernalization produced plants equivalent to spring varieties in floral behaviour. Data are given of the effect on winter rye of different durations of vernalizing treatment, ranging from nil to 10 weeks. The curve relating the score (an index of the conditions of the floral apex) to the duration of the vernalization period was sigmoid in form, suggesting that some part of the reaction to vernalization was autocatalytic in nature. Incomplete vernalization was partly reversible by exposure to high temperatures. It is suggested that during vernalization, a substance is formed from a precursor by a chain of reactions, in which some links are reversible. This substance is present in spring-rye varieties at germination ; in unvernalized winter-rye varieties, this substance is present in a very low concentration, but it accumulates slowly during growth. Further reactions from this substance depend on its concentration and on day length and, within limits, this determines whether primordia develop into leaves or into spikelets.—P.J.B.

785 Riepma Kzn, P. Opbrengstverhogende werking van DNC op winterrogge. [**The yield-increasing effect of DNOC on winter rye.**] *LandbVoorl.* 1954, **11,** No. 4, 180-2, bibl. 5. [Cent. Inst. Landbouw. Onderz., Wageningen, Neths]

A study was made of the stimulating effect of DNOC on the yields of rye. In order to determine whether the yield-increasing property of DNOC could be ascribed to its N content, the effect on the yield of rye of the ammonium salt of DNOC (5 kg. per ha.), ammonium nitrate (2.8 kg. per ha.), urea (2.1 kg. per ha.), orthonitrotoluol (9.6 kg. per ha.) and 2,4-dichlorophenol (4 kg. per ha.) were compared. An increase over the control (untreated) in the yields of rye grain and straw was brought about by the application of DNOC, but not by the other treatments. The effect of DNOC on rye crops treated with nitro-chalk at rates varying from nil to 120 kg. N per ha. was also studied. The DNOC was applied at the 3.25- and 4-leaf stages at a rate of 5 kg. per ha. in a thousand l. of water per ha. DNOC increased the yields of grain at all levels of N-application. The increase in yield obtained by the treatment with DNOC was greater when DNOC was applied at the 3.25 leaf stage than when applied at the 4-leaf stage. The effect of DNOC and N on the number of grains per ear and on the thousand-grain weight is illustrated by graphs.—W.J.B.

## BARLEY

786 Regt, A. de. De teelt van zomergerst op zoute grond. [**Growing spring barley on land flooded by seawater.**] *18de Jaarb. NaCo-Brouw. 1954* Rotterdam, 86-97, illus.

An account is given of the spring-barley crops obtained in Zeeuwsch-Vlaanderen, in the province of Zeeland, in 1953, on land flooded by sea-water in the spring of the same year. According to the advice of the Dutch Advisory Service, given at the time of the floods, spring barley could be sown with a reasonable expectation of obtaining 70% of normal yields, given normal rainfall, in soils where the salt concentration in the 5-20 cm. soil layer did not exceed 10 g. NaCl per l. soil moisture at the time of sowing. Rainfall in the period April-July 1953 was greater than the average. In general, the barley crops obtained were better than expected. Even on land with a salt concentration of 15-20 g. per l. of soil moisture, yields of spring barley amounting to 35-45% of normal yields were obtained. The sensitivity of the barley plants to drought was noticeable. Grain yields of 2500-4500, 1700-3600 and 800-3000kg. per ha. were obtained from polders where salt concentrations in the soil moisture at sowing time were 0-6, 6-10 and 10-20 g. per l. of soil moisture, respectively. The yields at any given salt concentration varied widely within the limits indicated. Yields were better on light than on heavy soils at a given salt concentration. Early sowing (March) gave much better results than April sowing. Among the varieties sown, Balder, Kenia, Piroline, Agio, Herta and Frisia, there was no marked difference in yield which could be attributed to varietal difference in salt-resistance. Balder gave the highest average yields. The applications of N to soils adversely affected by sea-water had an unusually beneficial effect on yield. The quality of malting barley grown on saline soils was good. The protein content of the dry matter of the grain was 10·2%, compared with a normal content of 10·3% for Dutch barley ; in experiments on flooded land in 1947, C. van den Berg found that grain from barley grown on land flooded with sea-water had an average protein content of 16%. [See *Versl. Landbouwk. Onderz.* 1950, Vol. 56, No. 16.]—W.J.B.

787 Northern Ireland Ministry of Agriculture. **Reports from the counties. Malting barley variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1954, **28,** No. 10, 296-301.

The results of trials in 1951-2, in which the yields and malting quality of the barley varieties Spratt Archer, Abed Kenia, Freja and Carlsberg were compared, are summarized as follows : (a) both Freja and Carlsberg outyielded Spratt Archer ; (b) Freja ripened about 14 days, and Carlsberg 7 days, earlier than Spratt Archer ; (c) both Freja and Carlsberg resisted lodging better than Spratt Archer ; (d) malting tests showed that of the varieties tested, Spratt Archer was the best, and Carlsberg the second-best malting barley.—W.J.B.

788 European Brewery Convention. **Third Report of the Barley Committee. Trials 1952.** *Europ. Brew. Conv.* Rotterdam, 1954, pp. 92, illus.

A detailed report is made on trials carried out in western and northern Europe to determine the yield and malting quality of barley varieties. In all the countries concerned, Carlsberg 2, Haisa and Herta were compared with the standard variety Kenia. In a number of countries, Earl and Isaria II were also grown. In addition to the 6 varieties mentioned, one or two other varieties were tested in most countries (e.g., Balder and Piroline in the Netherlands). Among the 6 chief varieties tested, Carlsberg 2 outyielded all others in Belgium, Finland, Germany (Bavaria), Netherlands, Ireland and Norway. Haisa gave the highest yield in Sweden, England and Germany (Rheinhessen). Carlsberg 2 outyielded Kenia significantly in nearly all countries. Carlsberg 2 and Herta were outstanding for stiffness of straw. Carlsberg 2 had the lowest N content and highest 1000-grain weight of the 6 main varieties tested. Herta germinated irregularly.—W.J.B.

789 Teichmann,—Auswinterungs-schäden. [**Damage from overwintering.**] *Dtsch. Landw. Pr.* 1954, **77,** No. 6, 78-9. [Oldenburg i. O., Lower Saxony, W. Germany]

For supplementary sowing following a crop failure due to winter injury, a barley known as a " Märzengerste " is indicated. This is not a new variety but a winter barley which is sown in March. In an emergency, the sowing of such a barley is the normal practice in the marshy country of north-west Germany. Here the night frosts of spring suffice to induce sprouting. In trials conducted by the Department of Agriculture of Weser-Ems, the yields of winter barley sown in March exceeded those of spring barley by 20-25%. March-sown winter barley, however, ripens 10-14 days later than ordinary winter barley and cannot completely replace it. Since, for various reasons, it is likely that fertilizers applied in autumn are no longer available to plants in spring, potassium phosphate should be added to those soils whose analysis shows a deficiency, or only a moderate amount, of K or P. It is assumed that March-sown winter barley can also be used in summer mixtures of oats, rye and legumes.—D.B.

790 KLINKOWSKI, M. Alte und neue Möglichkeiten der Bekämpfung von Pflanzenkrankheiten und Pflanzenschädlingen. [**The control of plant diseases and pests, old and new possibilities.**] *Kühn-Arch.* 1953, **67,** No. 1, 33-49, bibl. 29, English summary pp. 46-7.

The discussion includes an account of the author's own successful experiments in disinfecting barley seed contaminated with *Helminthosporium gramineum* in culture filtrates of 16 Actinomycetes and 10 strains of *Penicillium*, and the seed of *Phaseolus vulgaris* severely contaminated with *Pseudomonas medicaginis* in crude penicillin and crude streptomycin, respectively.—G.M.R.

791 HASKETT, W. C. and MURPHY, H. C. **Relative susceptibility of barley varieties to *Pythium graminicola* Subv.** [Abstract] *Phytopathology* 1953, **43,** No. 9, 474.

792 BOHNE, H. and GREIFFENBERG, H. Mineraldüngung und Wurzelwachstum bei S.-Gerste und Hafer. [**Mineral fertilization and root growth in summer barley and oats.**] *Z. PflErnähr. Düng.* 1954, **64,** No. 1, 67-72, bibl. 8. [Agrikulturchem. Inst., Univ. Bonn]

In a manurial trial, summer barley and oats were grown in sandy soil and oats in loam soil also. While the effect of manurial treatment was clearly perceptible in the aerial parts of the plants, it was hardly possible to see any effect on root growth, except in the case of the oats grown in sandy soil which showed a marked difference at the time of shooting into ear and flowering. In all the plants, however, almost without exception the largest quantities of roots were determined 4 weeks before flowering. From then up to flowering a slow decline set in, and at harvest only a fraction was found of the root masses determined at shooting. The view is therefore held that the cereal spp. studied have the largest amount of roots during the period of shooting into ear, possibly even earlier, and not, as other writers have affirmed, at flowering.—G.M.R.

793 MARTIN, R. P. and SCOTT RUSSELL, R. **Studies with radioactive tracers in plant nutrition. 3. The effect of radiation from phosphorus-32 on the growth and phosphate utilization of barley seedlings.** *J. exp. Bot.* 1954, **5,** No. 13, 91-109, bibl. 24, illus.

The effect of radiation from $P^{32}$ on the growth and phosphate absorption of barley seedlings was studied in water culture. Concentrations of carrier phosphate ranging from less than 0·01 to 31 ppm. P were employed for varying periods. Between experiments wide variations occurred in the nature and extent of the effects of radiation. An increase in the proportion of the absorbed phosphate translocated to the shoots, and the reduction of root weight, were the most consistent symptoms. While severe injury was characterized by a reduction in both growth and phosphate absorption, intermediate levels of $P^{32}$ on occasion caused increases in dry weight, in nutrient absorption, and in the development of lateral meristems. The interrelation of the observed effect of radiation is discussed and the extent to which the effects of radiation may complicate the interpretation of the results of plant physiology investigations is considered.—From authors' summary.

## MAIZE

794 JEFFREYS, M. D. W. **The history of maize in Africa.** *S. Afr. J. Sci.* 1954, **50,** No. 8, 197-200, bibl. 22.

795 PASCALE, A. J. Mapa fenológico del maíz en la República Argentina. [**Phenological map of the maize crop in Argentina.**] *Meteoros* 1953, **3,** No. 4, 383-94, bibl. 12, illus., English summary p. 383.

Phenological charts, showing isophenes for the sowing, tasselling and ripening of maize in Argentina, are reproduced and discussed. The observations from which the charts were prepared were made in 1947-52.—W.J.B.

796 LACROIX, L. La culture du maïs. [**The cultivation of maize.**] *Rev. Agric.* 1954, **7,** No. 3, 267-91, illus. [Sta. Phytotec., Gembloux, Belgium]

The results of cultivation trials of cob- and fodder-maize, conducted in 1953, are given in tables and graphs. Of the various experiments, most detailed results are given for the trials on the population density of cob-maize vars. Goudster and Wisconsin 240. An increase in the number of plants per ha. was accompanied by a decrease in tillering per plant (to a density of 80,000 plants per ha.), the number of ears per plant, the weight of grain per plant and the 1000-grain weight, and by an increase in the length of stems, and yield of grain per ha. (up to a population density of 80,000 plants per ha.). Yields were slightly higher with rows at 70 cm. apart than at 100 cm. apart. In the herbicide trials, maize was sensitive to MCPA, though this could be used as a weedkiller in maize fields. The cultivation of cob-maize as a nurse crop for lucerne, clover, vetch and ryegrass is not recommended because this results in lower yields of maize, which are not compensated for by the financial returns from the other crops. The results of the fodder-maize cultivation trials (var. Wisconsin 240) are given in less detail. For the population studies, plants were grown at three densities and at three distances between rows, 50, 75 and 100 cm. An increase in population density resulted in an increase in the number of ears per unit area while the number of ears per plant fluctuated ; the average weight of ears decreased.—D.B.

797 BALJURA, V. I. [**Some features of maize cultivation in the non-chernozem belt.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2**, No. 2, 38-45, illus. [Zonal Inst. Grain Husb., Non-Chernozem Belt]

798† BALDONI, R. Ricerche intorno al peggioramento dello stato di fertilità del terreno, indotto dal granoturco da foraggio. [**Investigations on the deterioration of soil fertility caused by fodder-maize.**] *Ann. Sper. agr.* 1954, **8**, No. 1, 113-32, bibl. 26, English summary pp. 130-1. [Ist. Agron. Univ. Bologna, Italy]

Three trials were carried out in Ancona Province, Italy, during 1950-2 to study the depressing effect of fodder-maize on the following crop, which was wheat in 2 cases and sugar-beet in another. These successions were compared with wheat preceded by a dry or an irrigated fallow, or by cowpea (*Vigna sinensis*). The fodder-maize was grown as a summer irrigated catch crop, sown at the rate of 150 kg./ha. and harvested in the flowering stage. Results from all the trials indicated that fodder-maize had a depressing effect on the yield of the following crop, and that it was possible to eliminate this effect completely by applying heavy amounts of N fertilizer. This depressing effect is thought to be caused by a particular microbic flora which develops on the root residues left by fodder-maize and results in a deficiency of assimilable N in the soil. It is concluded that it is probably uneconomical to apply heavy amounts of N as a remedy, and that cowpea could be grown advantageously instead of fodder-maize, although it yields less.—E.B.O.

799 BASILE, R. M. **Drought in relation to corn yield in the northwestern corner of the Corn Belt.** *Agron. J.* 1954, **46**, No. 1, 4-7, bibl. 10. [Geogr. Dep., Ohio State Univ., Columbus]

Observations are made on the relation between maize yields and drought incidence during 1914-49 in Beadle County, S. Dakota. There was evidence that in all years, there was a soil moisture deficiency for maize growing in this area. The effect of stored moisture in the soil in maintaining yields during years of severe drought was marked during 3 years ; in other cases, years of drought decreased maize yields during the following years when rainfall was relatively normal, owing to lack of soil moisture in the early part of the growing season.—P.J.B.

800 MILES, S. R. and others. **Performance of dent corn [maize] hybrids in Indiana through 1952.** *Sta. Bull. 508. Purdue Univ. agric. Exp. Sta.* 1953, pp. 44.

801 WOODWARD, R. W. and NIELSON, R. F. **Hybrid corn tests in Utah.** *Bull. 376. Utah agric. Exp. Sta.* 1954, pp. 17, illus.

Varietal and cultural recommendations are given for growing maize in Utah.—P.J.B.

802 FENAROLI, L. Rapporto sulla sperimentazione maidicola 1952. [**Report on experiments with maize in 1952.**] *Publ. 76. Bergamo Sta. sper. Maiscolt.* 1953, pp. 53, illus.

Unfavourable climatic conditions in Italy in 1952 caused a drop in the total maize production and the average yield per ha., which were 2,388,192,000 kg. and 1878 kg. respectively, compared with the previous year. The Station supervised 31 experimental fields in which trials were conducted to study adaptation and productivity. A schematic account of these trials is given, as well as a list of the hybrids and varieties tested. A list shows the maize hybrids and local varieties tested in northern Italy during 1947-52 and their average yields. Hybrid maize was grown on 8·7% of the total maize area. The total production of hybrid maize seed in Italy in 1952 was 4,500,000 kg. Trials to study the life cycle of several maize types were continued. [See also *Fld Crop Abstr.* 6 : 908.]—E.B.O.

803 RAGAI, H. and LOOMIS, W. E. **Respiration of maize grain.** *Pl. Physiol.* 1954, **29**, 49-55, bibl. 19, illus. [Iowa State College, Ames]

The effects of moisture content of the grain, temperature, concentrations of oxygen and carbon dioxide, and presence of micro-organisms on respiration of the grain of *Zea mays* under controlled laboratory conditions were studied. Besides contributing information on the physiological responses of maize, the findings should be of value in helping to solve storage problems.—D.B.

804 TATUM, L. A. **Seed permeability and " cold-test " reaction in *Zea mays*.** *Agron. J.* 1954, **46**, No. 1, 8-10, bibl. 13. [Kansas Agric. Exp. Sta., Manhattan]

The studies reported were made to determine whether seed permeability, as measured by the diffusion of solid materials out of the seed, was associated with the reaction of the seed to germination under cold-test conditions. The diffusion of materials from the seed was measured spectrophotometrically, following steeping in water for

48 hr. Readings indicating a high degree of turbidity in the water in which the seed was steeped showed a high, significant positive correlation with low germination percentages under cold-test conditions. From these results, it was suggested that factors known to reduce germination percentages under cold-test conditions, do so partly by inducing changes in the protoplast of the seed, which is reflected in increased seed permeability and diffusion of materials from the seed.—P.J.B.

805 Marshall, E. R. and Loeffler, G. **A comparison of different herbicides applied at planting, at emergence, and post-emergence on field corn.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 265-72. [G. L. F. Soil Build. Serv., Ithaca, N.Y.]

Maize was treated at sowing time, at emergence, and when the plants were 8-10 in. high, with the following materials : butoxy ethanol ester of 2,4-D (LV4), butoxy ethanol propanol ester of 2,4-D (BEPD), ethoxy ethoxy propanol formulation of 2,4-D (EEPD), the triethanolamine salt of 2,4-D (G.L.F.66), alkanolamine salt of DNOSBP (Sinox PE), CMU, phenyl dimethyl urea (PDU), 2,4-dichlorophenoxy ethyl sulphate (CH1), 2,4-dichlorophenoxy ethyl benzoate (Sesin), 2,4-dichlorophenoxy ethyl oxalate (6036), 2-methyl 4-chlorophenoxy ethyl sulphate (L474), the N butyl ester of MCPA, and 2,4,5-trichlorophenoxyethyl sulphate (Natrin). Rates of treatment were the same for pre-emergence and emergence applications ; in certain cases, post-emergence rates applied were half pre-emergence rates. Principal weeds present included: *Brassica* spp., *Ambrosia retroflexus*, *Asclepias syriaca*, *Cirsium arvense*, *Agropyron repens*, *Cyperus esculentus* and *Equisetum arvense.* Best results followed treatment at emergence. Following emergence treatments, best control of broad-leaved weeds was obtained where LV4, BEPD, EEPD, CMU, PDU, CHl and the butyl ester of MCPA were used. In most cases, control of perennial weeds was relatively less satisfactory. The most effective herbicides at emergence were LV4, CHl, Natrin, L474 and the butyl ester of MCPA. Pre-emergence treatments were second to emergence treatments in effectiveness. For combined control of both broad-leaved and grassy weeds, LV4, EEPD, CMU, PDU, Sinox PE and the butyl ester of MCPA were the most effective. CMU and PDU caused some injury to the maize. In further trials, a number of materials were applied as directed sprays for controlling grass weeds in maize 24-26 in. high. Materials used included 3, 6 endoxohexahydrophthalate (Endothal), TCA, trichloroacetanilide, trichloroacetylurea, a, a-dichloropropionic acid (Dalapon), phthalamic acid and amino triazole. Amino triazole and Dalapon gave the best control of grasses, but caused some injury to the maize, particularly in the case of amino triazole.—P.J.B.

806 Curtis, L. E. and others. **Field trials of planting applications of herbicides to corn.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 283-6, bibl. 2. [G.L.F. Soil Build. Serv., Ithaca, N.Y.]

Trials are reported on the use of a number of herbicides applied in bands over maize seed-rows at the time of sowing. Materials used included CMU, alkanolamine salt of DNOSBP (Sinox PE) and butoxyethanol ester of 2,4-D (LV4). Rates of treatment used were 1-1·5 lb. CMU per ac., 4·5-6 lb. Sinox PE and 1-1·5 lb. LV4 per ac., these rates applying to the actual amount of land treated (10 in. bands over rows 40 in. apart). All materials gave excellent control of broad-leaved weeds, except in one case where 3·5 in. of rain fell within 2 days after treatment on light soil. Best control of *Agropyron repens*, *Cyperus rotundus* and annual grasses was secured with Sinox PE, mainly thought to be the result of a relatively long residual effect where 6 lb. Sinox PE per ac. was used. LV4 appeared to have a shorter residual effect than Sinox PE. CMU (wettable powder) was difficult to maintain in suspension, causing irregularities in the rate of application ; where applications were uniform, there was evidence that it equalled Sinox PE in weed control.—P.J.B.

807 Harper, J. L. **Influence of temperature and soil water content on the seedling blight of maize.** *Nature, Lond.* 1954, **173,** No. 4400, 391-3, bibl. 4, illus. [Dep. Agric., Univ. Oxford]

Early plantings of maize in northern temperate climates (where the growing season is usually too short for grain ripening) seldom result in a good maize stand because in the germination phase the grain is attacked by fungi. A study of the conditions affecting seedling mortality has been carried out, using the maize variety Virginian White Horsetooth (a type grown as a forage-crop in Gt Britain and susceptible to damage in cold springs). Under conditions of the author's culture tests there is evidence that soil moisture is of the greatest importance in determining the extent of mortality of maize seedlings, and that pathogens are affected generally in the same way as the host, but are more tolerant to adverse conditions of both temperature and soil moisture. Distinction can be drawn between damage to maize caused by micro-organisms and that due to cold. It is concluded that in testing maize varieties for cold resistance, attention should be given to the elimination of variables which have hitherto been little studied.—M.H.

808 Rhind, D. **American maize rust in Africa.**

*World Crops* 1954, **6,** No. 3, 97-8. [Colon. Agric. Res. Comm.]

A Central American rust of maize, *Puccinia polysora,* was first noted in Africa (Sierra Leone) in 1949. Since then, *P. polysora,* which has proved to be more virulent in Africa than in America, has caused severe epidemics in the Ivory Coast, Gold Coast, Dahomey and parts of Nigeria in 1950, 1951 and 1952. [See *Fld Crop Abstr.* 6 : 439, 554 and 5 : 1108.] The overall loss of grain in West Africa in 1951 is estimated at not less than 40%. Early-sown crops escaped the most severe damage. In 1952-3, *P. polysora* was reported in most parts of central East Africa. At Ibadan, Nigeria, certain types of maize from Mexico and Venezuela, highly resistant to *P. polysora,* are being used in an attempt to breed resistant strains suitable for African conditions. Dusting plots of maize plants with sulphur gave a partial control of the disease and a 40% increase in yields over the undusted control plots at Ibadan.—W.J.B.

809 Storey, H. H. and Ryland, A. K. **Resistance to the maize rust, *Puccinia polysora.*** *Nature, Lond.* 1954, **173,** No. 4408, 778-9, bibl. 2, illus. [E. Afr. Agric. For. Res. Org., Kenya Colony]

The authors' genetical studies augment the information recorded in *Fld Crop Abstr.* 6 : 554 and 7 : 70.—M.H.

810 Talor, G. A. **The effects of three levels of magnesium on the nutrient-element composition of two inbred lines of corn [maize] and on their susceptibility to *Helminthosporium maydis.*** *Pl. Physiol.* 1954, **29,** No. 1, 87-91, bibl. 25, illus. [Pennsylvania State Coll., State College]

811 Ginter, Eileen L. and Smith, F. G. **Identification and colorimetric determination of the oxidases of the corn [maize] root tip.** *Iowa State Coll. J. Sci.* 1953, **28,** No. 2, 177-8, bibl. 12. [Iowa State Coll., Ames]

812 Fang, S. C. and Butts, J. S. **Studies in plant metabolism. III. Absorption, translocation and metabolism of radioactive 2,4-D in corn [maize] and wheat plants.** *Pl. Physiol.* 1954, **29,** No. 1, 56-60, bibl. 10, illus. [Oregon State Coll., Corvallis]

813 Brown, J. C. **Some observations on the reduction of 2, 3, 5 - triphenyltetrazolium chloride in plant tissue as influenced by mineral nutrition.** *Pl. Physiol.* 1954, **29,** 104-7, bibl. 10, illus. [Pl. Industr. Sta., U.S. Dep. Agric., Beltsville, Md]

Copper deficiency retards the development of reproductive organs of corn [maize], wheat and cockleburs (*Xanthium pensylvanicum*). The dye 2, 3, 5-triphenyltetrazolium chloride (TTC) was only weakly reduced in the copper-deficient plants. Maximum reduction of TTC was obtained in plants grown on a naturally calcareous soil or an organic soil to which copper was added. Comparative ascorbic acid oxidase activity and the concentration of copper and iron in corn and wheat showed that the reduction of TTC in these plants could best be correlated with copper than with iron nutrition.—Author's summary.

## SWEET-CORN

814 Jackson, A. A. **Hybrid sweet-corn at Wye.** *Agriculture, Lond.* 1954, **61,** No. 2, 77-9, bibl. 4. [Dep. Hort., Wye Coll., Univ. London]

Details of methods used at Wye College in the production of commercial crops of hybrid sweet-corn seed (known as Canada Cross or John Innes Hybrid) are described. Double rows of seeds sown in the first week in May and intended for seed-production alternate with single rows of pollen parent seed sown over a period of a fortnight which begins one week after the sowing of the double rows. The cobs are picked in early October, stripped and oven-dried at temperatures of 70-90°F. In 1952, the cobs were dried after 72 hr. in the oven and losses in weight caused by the drying process varied from 20 to 30%. In 1953, owing to the late development of the crop, seeds were harvested in a less mature condition than in 1952 and 6 days of artificial drying at 80°F. were required. The average loss of weight in the drying process in 1953 was 52% and the seed moisture content after drying was 13%. The germination of seed dried in 1952 and 1953 was 97 and 98%, respectively. In both years the yield of cleaned seed was 19 cwt. per ac.—W.J.B.

815 Lachman, W. H. **Weeding sweet corn with Premerge.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 95-6, bibl. 1. [Massachusetts Agric. Exp. Sta., Amherst]

Sweet-corn was treated with the following : 6 and 9 lb. DNOSBP per ac. as a pre-emergence treatment and 3 lb. DNOSBP per ac. when the plants were 1, 3 and 15 in. high. No plant injury followed the pre-emergence treatments. Treatments made when the plants were 3 and 15 in. high showed leaf-burn on the more mature leaves ; plants treated when 15 in. high had significantly lower grain yields than those subjected to the other treatments. The most economical and satisfactory treatments in terms of weed control followed the use of post-emergence applications when the plants were 1 in. high.—P.J.B.

816 Sweet, R. D. **The effect of certain environ-**

**mental factors on the response of sweet corn to herbicides.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 97-105, bibl. 2. [Cornell Univ., Ithaca, N.Y.]

The studies reported were made to compare 2,4-D with a range of herbicidal materials, using the early variety North Star and the late variety Golden Cross. Plot soil-types included a fine sandy loam and a silt-loam soil. The crops were sprayed at the spike stage and when 6 in. high, just before and just after the spray application of 0·5 in. irrigation water. A low- (normal commercial) and a high-rate of herbicidal application were used. The 2,4-D amine salt was unsatisfactory as a pre-emergence herbicide ; where leaching by irrigation occurred after application, plants were stunted. As a post-emergence treatment at low rates of application, 2,4-D was relatively efficient and economic in terms of weed control and lack of damage to the crop. 2,4-dichlorophenoxyethyl sulphate at rates of 6 lb. per ac. gave weed control comparable to 1 lb. per ac. 2,4-D amine. Weed control following CMU treatment at 0·4 and 0·8 lb. per ac. was good, but both pre- and post-emergence treatments stunted the crop during early growth. DNOSBP formulations, particularly the alkanolamine salts, gave excellent weed control and did not injure the crop where applied as pre-emergence treatments, even under conditions of heavy leaching. Post-emergence treatments caused damage to the foliage. Dalapon (a, a-dichloropropionic acid) injured the sweet-corn, gave poor control of broad-leaved weeds, but excellent control of grassy weeds. NaPCP, both as a pre- and post-emergence treatment gave outstandingly good results in terms of weed control and lack of injury to the crop, when applied at rates of 6 and 12 lb. per ac. PCP, at rates of 3 and 6 lb. per ac. gave poor weed control. NaPCP, PCP and CMU were least affected by varying environmental factors. NaPCP was considered worthy of further study as a herbicide for use on sweet-corn.—P.J.B.

817 TREVETT, M. F. and others. **Pre-emergence weeding sweet corn with 2,4-D, dinitro and isopropyl trichlorobenzoic acid.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 193-201. [Agron. Dep., Univ. Maine, Orono]

The following herbicidal applications were made to sweet-corn sown on a sandy loam soil : 1 lb. acid equivalent of 2,4-D ester per ac., 1 lb. acid equivalent of 2,4-D amine per ac., 3 lb. alkanolamine salt of DNOSBP per ac. and 5 and 10 lb. isopropyl trichlorobenzoic acid (XTB) per ac. The herbicides were applied when about 25% of the plants had emerged and were about 0·25 in. high. Half of each plot was irrigated 3 hr. after treatment to wet the soil to a depth of 3 in., while the remaining halves received 0·4 in. of rainfall 6 days after treatment. The 2,4-D amine and ester treatments resulted in significantly lower maize yields than untreated controls. DNOSBP and XTB had no significant effect on yields. Weeds present were mainly *Brassica* spp., *Chenopodium* spp. and *Echinochloa* spp. Ten lb. XTB per ac. resulted in significant stand reductions on plots not irrigated following treatment. The 2,4-D amine and ester gave significantly better control of broad-leaved weeds than the other materials ; 3 lb. DNOSBP and 10 lb. XTB per ac. were significantly superior to 5 lb. XTB per ac. in this respect, while 5 lb. XTB was significantly superior to normal cultivation practices. DNOSBP was more reliable than 2,4-D for controlling annual grasses and would control them when in the 1- to 2-leaf stage. XTB was effective only when applied before weed emergence. —P.J.B.

818 DALLYN, S. **The effect of soil organic matter levels on several herbicides.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 13-20, bibl. 3.

The trials were carried out on soils containing below 3, 3-3·5, 3·5-4 and over 4% organic matter. Crops used were sweet-corn and red beet, sown on 18 June. Pre-emergence treatments with CMU were applied on 20 June, emergence treatments with 2,4-D on 22 June and post-emergence treatments with Crag Herbicide (sodium 2,4-dichlorophenoxyethyl sulphate) and Sesin (2,4-dichlorophenoxyethyl benzoate) were applied on 18 July. Rates of treatment for CMU were 0·375, 0·75 and 1·5 lb. per ac., for Crag and Sesin, 2, 4 and 8 lb. per ac. and 0·5 and 1 lb. per ac. for 2,4-D amine salt. In the case of sweet-corn, only Crag and CMU significantly affected fresh-weight yields, this effect being markedly influenced by the organic-matter content of the soil. Sweet-corn grown on soils with less than 3% organic-matter content was severely injured as rates of CMU treatment increased to 1·5 lb. per ac. Where the organic-matter content of the soil exceeded 3·5%, rates of CMU up to 1·5 lb. per ac. had no significant effect on plant growth. The response to Crag was very similar to that to CMU. Pre-emergence treatments with CMU made to red beet had no significant effect on plant growth, regardless of soil organic matter. Rates up to 1·5 lb. CMU per ac. resulted in marked stand reductions where soil organic-matter contents were below 3% ; where organic-matter contents varied from 3-4%, there was a tendency for stands to decline where 1·5 lb. CMU per ac. was applied. Where soil organic-matter contents exceeded 4%, 1·5 lb. CMU per ac. did not injure stands. Each increment of CMU treatment increased weed control, regardless of the organic-matter content of the soil, though best weed control was secured where organic-matter contents in the soil were low. 2,4-D gave poor weed control. Data are not given of weed control following post-emergence treatments with Crag and Sesin.—P.J.B.

## MILLET AND SORGHUM

819 PONNAIYA, B. W. X. and APPATHURAI, R. **Proper time of sowing irrigated millets in the Koilpatti tract—a preliminary study.** *Madras agric. J.* **40,** No. 12, 532-6, bibl. 1.

An attempt was made to determine the optimum sowing dates for the following millets grown on irrigated land in Madras : *Sorghum subglabrascens*, *S. dochna*, *Pennisetum typhoides* and *Eleusine coracana*. Generally, June and July, were the best sowing months, except for *S. subglabrascens* which gave its highest yields when sown in April. *S. dochna* can be sown from June to September. The optimum sowing period for *E. coracana* was June-August. None of the millets studied yielded well when sown in the period November - March.—W.J.B.

820 GHOSH, A. K. and SINGH, R. P. **Report of the Agronomy Department, 1952-3. Jowar fodder experiment.** *Allahabad Fmr* 1953, **27,** No. 5, 169-76. [Agric. Inst. Allahabad, U.P., India]

Replicated experiments were carried out with fodder sorghum to determine the effect on the yields of green fodder of (1) various seed-rates and (2) spacings between rows of 1·5, 2, 2·5 and 3 ft. There was no significant difference between the yields from plots sown at various rates. There were significant differences between the yields obtained using different row-widths. The highest average yield of green fodder, 462 maunds per ac., was obtained when the spacing between rows was 2 ft. The lowest average yield, 380 maunds per ac., was obtained from broadcast plots. [1 maund = 82 lb. approx.]—W.J.B.

821 JONES, K. W. **Further experiments on witchweed control. 1. The effect of hormone weed-killer applications at different rates and times on irrigated dura** [*Sorghum vulgare*]. *Emp. J. exp. Agric.* 1953, **21,** No. 84, 331-9, bibl. 6. [Minist. Agric., Sudan Govt, Gezira Res. Fm]

The value of 2,4-D for controlling witchweed (*Striga hermontheca*) in sorghum was established in 1951 [See *Fld Crop Abstr.* 6 : 104]. In 1952 further experiments were carried out with the sorghum varieties Feterita, Mugud, Dwarf White Milo, Dwarf Higeiri and Wad Fahl, to determine the effect of the rate and date of 2,4-D application, the variety of sorghum and the degree of infestation with witchweed on the yield of sorghum obtained on soils of various levels of fertility. The herbicide was applied at four different rates, nil, 0·5, 1 and 2 lb. per feddan [1 feddan = 1·038 ac.] and at four different dates, 2, 3, 4 and 5 weeks after the sorghum was sown. The varieties Feterita and Wad Fahl were significantly more infested than were Mugud and Dwarf White Milo. All rates of application gave significant reductions in the witchweed population compared with control (no 2,4-D). One lb. 2,4-D per feddan gave a significantly greater reduction of the witchweed population than 0·5 lb. per feddan, but, except on the most heavily infested field, the 2 lb. rate did not give significantly better control than the 1 lb. rate. The application of 2,4-D at 2 or 3 weeks after the sowing of the sorghum gave significantly better control of witchweed than an application 4 or 5 weeks after sowing. The variety Wad Fahl gave higher yields than any other variety under all 2,4-D treatments, although without treatment its yield was the next to the lowest recorded. Dwarf White Milo (the variety most resistant to witchweed) gave the highest yield on plots not treated with 2,4-D but was outyielded by Wad Fahl and Mugud on plots receiving 1 lb. 2,4-D per ac. Greater increases in the yield of sorghum grain were obtained in response to the application of 2,4-D on the more fertile and more heavily infested plots than on plots relatively less fertile and less infested with witchweed.—W.J.B.

822 WEBSTER, J. E. and others. **The chemical composition of sorghum roots and its relation to chinch bug injury.** *Tech. Bull. T-49. Okla agric. Exp. Sta.* 1954, pp. 9, bibl. 10.

Studies of the seasonal composition of the roots of sorghum varieties, including those resistant and not resistant to chinch bug [*Blissus leucopterus*], did not show any relation between chinch-bug resistance and root composition during early growth, or during the time when differences in chinch-bug resistance were most marked.—P.J.B.

## RICE

823 OPSOMER, J. E. and others. La culture du riz au Congo belge. [**Rice cultivation in the Belgian Congo.**] 1950, pp. 88, bibl. 46, illus., map, Bruxelles ; Minist. Colon., Dir. Agric. [Received 1954]

Rice cultivation was introduced into the Belgian Congo by the Arabs about 1840 but it remained confined to some eastern districts until 1914-18, when the Service de l'Agriculture decided to extend it to other parts of the country. The principal rice districts are now situated near the equator, in an area delimited by lat. 4° N. and S. There are great possibilities of extending rice cultivation further. The methods of growing rice, including crop rotations, practised in the Belgian Congo, are described. The methods adopted at the INÉAC Station are based on those practised by the natives. On the European farms, rice yields from unimproved varieties reach 1500-2000 kg. of dry paddy per ha. and from selected varieties 2500-3000 kg. ; on the native farms the corresponding yields are estimated at 600-1000 kg. and about 1500 kg. A great amount of work has been conducted at the Yangambi Station since 1933 to improve rice cultivation. It includes investigations on cultural methods, and introduction, selection and adaptation of new varieties. A description is given of the most important selected varieties. Information is also given on the climate and soil of the rice districts, diseases and pests, milling and processing.—E.B.O.

824 Ashby, H. K. **Off-season padi trials in the Salor irrigation area, Kelantan, in 1953.** *Malay. agric. J.* 1954, **37,** No. 1, 3-11, illus. [Dep. Agric. Kelantan, Malaya]

An attempt was made to demonstrate to smallholders the possibility of growing a crop of swamp rice during the relatively dry season (March-July), in addition to the main crop harvested in March, by making use of the irrigation water available in the Salor Irrigation Area. Owing to the fact that draught animals were not available for work in the dry season (they are normally rested at this time) mechanical means of cultivation were used. Approximately 1 tractor per 35 ac. was required for cultivations. Clods were finally broken down under wet conditions by the use of tractor-mounted rolls. Standard Padi Manure was issued to cultivators for application at rates of 200 lb. per ac. Short-term rice varieties, Taichu 65 and Pe Mi Fun were used. Wet nurseries were established from 4-12 April. Transplanting was carried out between 29 April and 17 May. Attacks by *Leptocorisa acuta* caused losses estimated at 33% of the crop. The yields of the crops, harvested in July and August, varied, between plots, from 50-380 gantangs of paddy rice per ac. [1 gantang = 5·3 lb.]. The highest yields (380 gantangs per ac.) were comparable with those obtained from main-crop swamp rice crops in the area. The low yields on some plots are attributed to negligence on the part of some cultivators who were reluctant to co-operate in the trial.—W.J.B.

825 Ganguly, B. D. and Ralwani, L. L. **Possibilities of growing ratoon crop of paddy and increasing its yield under irrigated conditions.** *Sci. and Cult.* 1954, **19,** No. 7, 350-1, bibl. 3. [Agric. Res. Sub-Sta., Karnal, India]

Two simple unreplicated experiments were carried out to determine the yields obtainable from ratoon crops of rice and the effect on ratoon crops of variations in the date of transplanting and rates of manuring. In the first experiment, N.P.97 rice was transplanted on 14 May, 1952, and harvested on 14 September, yielding 1835 lb. of grain per ac. The plot was then divided into 3 sections, one of which was left unmanured whilst the other two were treated with ammonium phosphate at rates of 20 and 40 lb. N per ac., respectively. The ratoon crop from these 3 sections was harvested on 14 November, and, in order of ascending applications of N, yielded 570, 740 and 845 lb. of grain per ac. In a second experiment in the same year, N.P.125 rice was transplanted to manured ground on 1, 15 and 30 June. The highest yield from the ratoon crop, 740 lb. per ac., was obtained from plants transplanted on 1 June and the lowest yield, 350 lb. per ac., from those transplanted on 30 June.—W.J.B.

826 Buffa, E. Convenienza economica del trapianto. [**The economic advantage of transplanting** (**rice in Italy**).] *Riso* 1954, **3,** No. 4, 4-6, illus.

827 Hirano, T. and others. **Analysis of the mechanism of low-yielding of rice caused by late transplanting. 2. Growth of interference of the plant in the nursery.** [Japanese] *Proc. Crop. Sci. Soc. Japan* 1953, **22,** No. 1-2, 23-4, English summary p. 24. [Tôhoku Agric. Exp. Sta.]

The interference with each other's development of rice plants, sown in nursery-beds at various rates, was studied. The cessation of the formation of tillers was taken to represent the onset of interference between plants. The variety Sekiyama, sown at rates of 541, 180, 54, 18 and 5·4 cc. per 3·3 sq. m., ceased tillering, for each rate of sowing respectively, at 35, 45, 55, 65 and 75 days from sowing in nursery-beds. It is therefore recommended that sowing rates should be lower than normal when, owing to the prolonged harvesting of winter crops such as barley, a delay in transplanting rice from the nursery is anticipated.—W.J.B.

828 Hirano, T. and others. **Analysis of the mechanism of low-yielding of rice caused by late transplanting. 3. Yielding responses of seedlings grown at different densities in the nursery.** [Japanese] *Proc. Crop. Sci. Soc. Japan* 1953, **22,** No. 1-2, 47-8, English summary p. 48. [Tôhoku Agric. Exp. Sta.]

The yields of rice plants, transplanted 30 days later than is normal, after being grown in nursery seed-beds sown at various rates, were compared. [See Abs. 827 for the effect of plant density in the nursery on tillering.] The yields of crops transplanted 30 days late from nursery-beds sown at 541, 180, 54, 18, 5·4 and 2·8 cc. per 3·3 sq. m., were 35, 54, 65, 77, 87 and 144 per cent, respectively, of the yield of a crop transplanted at the normal time.—W.J.B.

829 Slusher, M. W. **The use of airplanes on rice farms in Arkansas.** *Bull. 541. Ark. agric. Exp. Sta.* 1953, pp. 20.

Among aspects reviewed, mainly from the economic standpoint, are the use of aeroplanes for sowing, manuring and controlling weeds with 2,4-D, and applying field desiccants.—P.J.B.

830 CHEVALIER, A. Quelques problèmes d'actualité relatifs à la riziculture dans le monde. [**Some present problems of rice cultivation in the world.**] *Rev. int. Bot. appl.* 1953, **33,** No. 373-4, 570-7, bibl. in text.

This article is mainly concerned with Indo-China, Morocco, Senegal and Madagascar.—E.B.O.

831 BROWN, F. B. **Varietal extension trials with wet padi, 1952-53.** *Malay. agric. J.* 1953, **36,** No. 4, 218-25.

Extension trials in 1952-3, in which the varieties Seri Raja, Serendah Kuning and Reyong 6 were compared with local varieties in various districts of Perak and Malacca, are described. The trials were carried out on smallholders' land. Seri Raja significantly outyielded local varieties in the Bagan Serai and Briah districts of South Krian, Perak. Local varieties were significantly outyielded by Reyong 6 in the Central West district of Malacca and by the variety Serendah Kuning in the inland district of Jasin in Malacca. The results of the trials illustrate the desirability of establishing the most suitable varieties for each district.—W.J.B.

832 CASATI, S. R. Esperienze sulla resistenza di alcune razze di risone al *Fusarium moniliforme* Sh. [**Trials to test the resistance of some paddy varieties to *Fusarium moniliforme* Sh.**] *Riso* 1954, **3,** No. 5, 14-17, illus.

From results in 1952 and 1953 it is concluded that (a) the resistance of the rice varieties tested to *Fusarium moniliforme* was almost constant in both years ; (b) the susceptible varieties were placed in the following order of decreasing susceptibility : Arborio, Sesia, Carnaroli, Maratelli ; (c) the most resistant were Stirpe 136 and Razza 77, followed by Ardizzone ; (d) Originario and Rinaldo Bersani occupied an intermediate position.—E.B.O.

833 GOOR, G. A. W. van de. **The mentek disease of lowland rice in Indonesia.** *Neths J. agric. Sci.* 1954, **2,** No. 1, 44-7, bibl. 10. [Agric. Res. Sta. Bogor, Java]

The factors which appear to influence the development of mentek disease in rice (the symptoms closely resemble those of potash deficiency in other cereals) are discussed.—W.J.B.

834 BORASIO, L. and others. La distruzione chimica delle alghe. Un nuovo prodotto il " Disalgon ". [**The chemical control of algae. Disalgon, a new preparation.**] *Colt. G. vinic. ital.* 1953, No. 4, pp. 7, bibl. 6, illus. [Sta. Sper. Risicolt., Vercelli, Italy]

In the rice-fields of northern Italy, algae are usually controlled by suspending irrigation for a short period, by raking or by the use of copper sulphate [see *Fld Crop Abstr.* 4 : 379]. Recent investigations showed that algae can be controlled effectively and cheaply by Disalgon, a new proprietary preparation (abbreviated name O.M.C.$_{30}$). Disalgon, a fine powder, is applied mixed with an inactive powder. —E.B.O.

835 GANGULEE, H. C. **Types of flowering behaviour in rice *Oryza sativa* Linn. and the distinctiveness of the aman type.** *Curr. Sci.* 1954, **23,** No. 3, 80-1, bibl. 9, illus. [Bot. Dep., Presidency College, Calcutta]

The influence of the length of the natural photoperiod on the date of flowering of 10 aman (autumn-winter), 5 aus (summer), 2 boro (spring) varieties of Indian rice and 1 Javanese, 5 Japanese and 8 USA varieties was studied in 1951-3. All varieties were sown in each month of the year. The flowering behaviour of aman varieties was outstandingly uniform in contrast with aus, boro and all foreign varieties. Twelve monthly sowings of 6 aman varieties gave 54 flowerings during October-December, 18 during January-April and none during May-September. No other varieties showed the same concentration of flowering within a short period ; the flowering curve of other varieties, which was higher than that of aman varieties during most of the year, showed a depression during the winter months and a peak in spring.—W.J.B.

836 WORMER, Th. M. **The influence of light intensity on the photoperiodical behaviour of the rice plant.** *Neths J. agric. Sci.* 1954, **2,** No. 1, 48-9, bibl. 1, illus. [Lab. Trop. Crop Husb. Agric. Univ. Coll., Wageningen]

The photoperiodic behaviour of two varieties of rice, Kameji and Nero di Vialone was compared in an experiment in 1952 in which the rice plants were grown in 12 hr. daylight only and in 12 hr. daylight plus 6 hr. light from a fluorescent tube with an intensity ranging from 1-80 foot-candles. The extension of the period sowing-to-earing caused by increasing intensity of the supplemental light was most notable over ranges of light-intensity of 1-2 and 1-10 foot-candles in the case of Nero di Vialone and Kameji, respectively. Increasing light-intensity from 2-80 foot-candles had no effect on the length of the period sowing-to-earing in the case of Nero di Vialone ; in the case of Kameji there was a steady increase of the length of the period sowing-to-earing as the light intensity was increased from 10-80 foot-candles.—W.J.B.

837 YAMADA, N. **Auxin relationships of the rice coleoptile.** *Pl. Physiol.* 1954, **29,** No. 1, 92-6, bibl. 21, illus. [Calif. Inst. Techn., Pasadena]

The reason for the superior growth of the rice coleoptile when under water, instead of in air, was investigated by growing decapitated rice coleoptiles (1) submerged in, and (2) floating on the surface of, water and also growing coleoptile sections (1) submerged in, and (2) floating on the surface of, indoleacetic acid solutions, the concentrations of which ranged from 0·01 to 50 mg/l. Of the coleoptile sections growing in indoleacetic acid, those submerged showed a greater growth response to increased concentrations of indoleacetic acid than those growing on the surface. The superior growth of the rice coleoptile under water is probably due to a lower capacity of the tissue to destroy auxin when submerged i.e. under a lower pressure of oxygen than when in contact with air (21% oxygen). It is suggested, as a working hypothesis, that growth of the rice coleoptile is determined by the interaction of two important opposing factors : (i) decrease of auxin destruction at lower oxygen tension (submerged), and (ii) decreased aerobic respiration at low oxygen tension.—D.B.

838 Borasio, L. L'assorbimento del carbonio nella pianta del riso. [**Carbon absorption in the rice plant.**] *Risicoltura* 1949, No. 3, pp. 10, bibl. in text, illus. [Received 1954] [Sta. Sper. Risicolt., Vercelli, Italy]

The percentages of various chemical elements in the grain and straw of the rice variety Originario are tabulated, as well as the amounts of the principal elements taken up per ha. by this crop which yields up to 6500 kg. of grain per ha. Carbon is by far the most important element, its amount in rice grain and straw being about 20 times the total amount of N, P and K. In Italy, the application of large quantities of farmyard manure (20,000 kg. per ha.) is considered indispensable for obtaining high rice yields. Yields were found to fall by 20-30% when the application of farmyard manure was suspended for a few years. A pot trial, in which plants were grown in an atmosphere deprived of $CO_2$, confirmed that rice absorbs carbon, not only from the air, but also directly from the soil. Similar results were obtained with maize and wheat.—E.B.O.

839 Brown, F. B. **Hybrid vigour in rice.** *Malay. agric. J.* **36,** No. 4, 1953, 226-36.

In a study of hybrid vigour in rice made in 1951-3, 28 crosses of Malayan varieties of rice were used. There were significant increases in the number of tillers per plant (average increase 5·04 tillers per plant) and in the yield of grain per plant (increases varying from 9·1 to 130·5%) in the $F_1$ generation compared with the parent plants. Plant height, the period from sowing to flowering and 100-grain weight were favourably affected by hybridization in a few cases only.—W.J.B.

840 Del Valle, C. G. and Babe, E. Tolerancia del arroz al cloruro de sodio en cultivos de aniego. [**The tolerance of rice to sodium chloride in irrigation water.**] *Bol. 66. Esta. exp. agron., Cuba* 1947, pp. 16, bibl. 16, illus. [Received 1954]

The effect of different concentrations of NaCl in irrigation water on the growth and yield of rice plants was determined in pot experiments carried out in 1943 in which the plants were supplied with water containing NaCl in concentrations of 0·15, 0·25, 0·35, 0·5 and 1·0%. The tolerance of the rice plants to NaCl was found to vary with age of the plants at the time when water containing NaCl was first applied. The yields of plants 30 and 60 days old when salt water was first applied were markedly depressed by the application of water containing 0·15% and 0·25% NaCl, respectively, up to harvest-time. Water containing 1% NaCl had no apparent effect on the yield of plants 90 days old when the salt water was first applied. Concentrations of 0·5% NaCl in the irrigation water prevented the production of grain by plants 30 and 60 days old when salt water was first applied. The effects of salt water irrigation on the development and appearance of the plants was recorded.—W.J.B.

841 Malavolta, E. **Studies on the nitrogenous nutrition of rice.** *Pl. Physiol.* 1954. **29,** No. 1, 98-9, bibl. 4. [Univ. Calif.]

The study was undertaken to resolve the controversy of the nitrogen nutrition of rice (*Oryza sativa*), by nitrates or by ammonium salts. When grown in nutrient media containing nitrogen either as nitrate or as ammonium salt, or a combination of the two, together with 0·01 or 0·05 ppm. molybdenum, some cultures being aerated, while others were not, the highest yield of root and shoot was obtained from the non-aerated nutrient solution containing nitrate N and 0·50 ppm. molybdenum. From the chemical analyses of plants, it is concluded that the reduction of growth in the plants fed with ammonium salts was due, in part, to the toxic accumulation of free and combined ammonia, and also to " implications in the photosynthetic and respiratory mechanisms as revealed by the sugars and organic acid determinations ". The harmful influence of forced aeration may be related to ion accumulation, a problem now being studied by the radioisotopic technique.—D.B.

842 Malaya Department of Agriculture. **Notes on current investigations, July to September, 1953. Padi. Results of the 1952-1953 season wet padi manurial and cultural trials.** *Malay. agric. J.* 1953, **36,** No. 4, 247-8.

The results of manurial trials with irrigated rice in northern Malaya are summarized as follows : (a) yield increases of 2-3 cwt. of grain per ac. may be obtained in many parts of Kedah and Province Wellesley by the application of phosphatic manures, supplying 100 lb. $P_2O_5$ per ac., just before transplanting, (b) differences between the effects of various commercial types of phosphate, applied to rice fields just before transplanting, are small, (c) there are advantages in using small quantities of highly concentrated types of phosphate in place of large quantities of normal types, (d) there is no apparent advantage in using a combined form of N and P fertilizer in place of applying the two plant nutrients as separate fertilizers, (e) sulphate of ammonia is a more effective form of N fertilizer than sodium nitrate ; little advantage is derived from placing these fertilizers 3 in. below the mud surface instead of on the surface, (f) there appears to be an advantage in applying part of the N manures 4-8 weeks after transplanting, (g) with few exceptions, there is little response to applications of calcium and magnesium in the northern areas of Malaya, (h) nursery manuring may be effective in increasing yields, (i) rice sown broadcast gives yields equal to those obtained by transplanting. In general the results of the trials were conclusive for Kedah, Province Wellesley and the north-eastern regions of Malaya ; no consistent results have been obtained from the trials in northern Perak.—W.J.B.

843 Goor, G. A. W. van de. **The value of some leguminous plants as green manure in comparison with *Crotalaria juncea*.** *Neths J. agric. Sci.* 1954, **2,** No. 1, 37-43, bibl. 10. [Agric. Res. Sta. Bogor, Java]

The effect of *Crotalaria juncea* and other leguminous green manure crops on the yields of succeeding crops of rice was determined in 5 experiments, on various soil types, carried out in 1929-39. In 4 out of the 5 experiments, C. *juncea* had a more beneficial effect on the yield of succeeding rice crops than any other green manure tested.—W.J.B.

## TEOSINTE

844 Melhus, I. E. and Chamberlain, Iris McK. **A preliminary study of teosinte in its region of origin.** *Iowa State Coll. J. Sci.* 1953, **28,** No. 2, 139-64, bibl. 27, illus. [Iowa State Coll. Guatemala Trop. Res. Cent., Antigua, Guatemala]

Studies are reported on the distribution, growth, food value and cultivation in Guatemala, of teosinte (*Euchlaena mexicana*). Teosinte appeared to be locally distributed in areas between 2000 and 5000 ft. a.s.l. in the highlands of Guatemala. Notes are given on some possible early uses of teosinte by the aboriginal inhabitants of Guatemala. Data are given of the chemical composition of teosinte and maize. The protein content of de-hulled teosinte grain ranged from 18·75 to 23·65% and the fat content from 2·26 to 4·43%. The content of 10 essential amino acids in polished teosinte grain compared well with that in maize meal, oat meal, unpolished rice and whole wheat grain. In preliminary field trials, the seed yield of teosinte on 4 plots during 1952 ranged from 1065 to 1700 lb. per ac., with moisture contents ranging from 13·9 to 18·9. The method of harvesting entailed the loss of a proportion of the seed. The percentage of grain from machine-hulled seed was 40. It was considered that any programme for producing bred strains of teosinte should include the production of strains with large seeds. Teosinte was found to be a host to most of the pathogens and insect pests which affect maize, but was relatively less affected by them, compared with maize. Notes are given on the use of teosinte grain as human food.—P.J.B.

## GENERAL

845 Sprague, M. A. **The effect of grazing management on forage and grain production from rye, wheat and oats.** *Agron. J.* 1954, **46,** No. 1, 29-33, bibl. 7. [New Jersey Agric. Exp. Sta., New Brunswick]

The trials reported were carried out during 1948-51 in New Jersey. Crops used were : Balbo rye, Thorne wheat and Wintok oats, sown each autumn on ploughed-up pasture land. Applications of 650 lb. 7-7-7 (NPK) per ac. were made at sowing time. Grazing was controlled by electric fencing and started when the crops were 5-7 in. high, about 30 days after sowing. Spring grazing ceased when the plants were eaten down to a height of 2·5 in., or as soon as stem elongation began. Average annual dry-forage yields where wheat, rye and oats were grazed in autumn were 763, 1034 and 513 lb. per ac.; where spring grazing was practised, yields averaged 1656, 2618 and 748 lb. per ac., while forage yields where both autumn and spring grazing were practised averaged 1911, 3043 and 940 lb. per ac., respectively. Average grain yields of wheat, rye and oats where the plots were not grazed averaged 27·1, 28·5 and 44·7 bu. per ac., respectively. Where autumn grazing was practised, average grain yields were 31·9, 21·6 and 50·5 bu. per ac. ; where the plots were grazed in spring, average yields were 18·9, 20·9 and 45·1 bu. per ac. and where plots were grazed in both autumn and spring, yields averaged 23·3, 21·8 and 53·3 bu. per ac., respectively. Where rainfall and temperature conditions were more favourable for growth than normally, autumn grazing resulted in considerably higher grain yields than where the plots were not grazed. Spring grazing reduced straw yields by nearly 40% while autumn grazing had very little effect ; all crops responding similarly in this respect. The effect of autumn grazing was to delay internodal elongation in spring, thus delaying exposure of the terminal buds to grazing.—P.J.B.

846 Thakur, C. and Shands, H. L. **Spring small grain agronomic response to plant clipping when seeded at two rates and fertilized at two**

**levels of nitrogen.** *Agron. J.* 1954, **46,** No. 1, 15-19, bibl. 12. [Agron. Dep., Univ. Wisconsin, Madison]

The studies reported were carried out during 1948 and 1949 on fertile Miami silt loam. Varieties used were: Moore, Kindred and H55-32 barley; Clinton, State's Pride and Vicland oats, and Henry wheat, all of which were sown in spring. Sowing rates per 18 ft. of row were 8·5 and 17 g. for barley, 7·5 and 15 g. for oats and 8 and 16 g. for wheat. The higher of the 2 sowing rates corresponded approximately to 1·5, 2·5 and 1·5 bu. per ac. for barley, oats and wheat, respectively. Applications of nil or 60 lb. N per ac. were made to all plots. Clipping treatments were: once on 14 June in 1948, and twice, on 27 May and 2 June, in 1949, to a height of 3-4 in. In greenhouse studies, each variety was grown in temperatures of 61, 64 and 78°F. and clipped once, 3 times, or 5 times when the plants were 8 in. high. Clipping was to a height of 6 in., with intervals of 1 week between successive clippings. Plant characteristics in the field trials were more affected by clipping than by N treatments, or sowing rates. Grain yields, in most cases, were significantly reduced by clipping, mean reductions for all varieties being 14% in 1948 and 48% in 1949. The difference between yield reductions following clipping in 1948 and 1949 did not occur in the case of Clinton oats, mainly owing to the high capacity for late tillering in this variety. Barley was more physiologically developed than oats or wheat at given dates of clipping and suffered more in terms of grain yield reduction. The use of N increased the mean grain yield of all varieties by 8% in 1948 and 5% in 1949. In 1948, both sowing rates resulted in similar grain yields; in 1949, the higher sowing rate resulted in 5% higher yields than the lower rate. Plant height, length of spike or panicle, stem diameter, root diameter and length of second internode were reduced by approximately 27, 18, 21, 62 and 35%, respectively, by the 1949 clipping treatments. In the greenhouse studies, clipping once, 3 and 5 times reduced the root volumes of all varieties by 15, 50 and 70%, respectively. Temperatures of 61 and 64°F., but not 78°F., favoured root growth. The use of clipping to reduce lodging is discussed.—P.J.B.

847 Sokolov, N. P. [**Pre-sowing treatment of seed with nutrients.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 2, 66-70.

The treatment described is the malting method, the object of which is to supply the grain with supplementary nutrient substances necessary for the developing embryo. To prepare the malt, for each centner (100 kg.) of seed to be dressed, 5 kg. of the same variety or type of seed is needed. (If seed of a leguminous species is available, the malt should be prepared from 2·5 kg. legume grain and 2·5 kg. of the seed to be treated.) The grain is soaked in water for 24 hours and is then strewn, in a layer about 10-12 cm. thick, and kept at a temperature of 4 to 7° [C.] until germination takes place (the best malt is obtained by germination at low temperature). When about half the grains develop rootlets, the grain is strewn, 2-3 cm. thick, in a layer and kept in a ventilated grain-drier at a temperature not above 40°C. The dried germinated grains (together with broken growths and rootlets) are ground to a meal which is stored in a cold, dry place until sowing time. Seed is treated 2 days before sowing. The nutrient substance is prepared in two doses. (For 100 kg. seed, 4-5 kg. of the meal are mixed in 20 l. water.) In the first place 2 or 2·5 kg. meal are strewn on 10 l. water, shaken and steeped for 5-6 hours. Then the infusion is poured on the grain and the whole thoroughly mixed. Secondly, the remaining 2·5 kg. of the meal is prepared in the same way as the first half and then poured over the same sample. At this second soaking (of 2 hours duration), formalin is added to the infusion and the grain is covered with a tarpaulin. The moistened grain is subsequently raked into mounds where it remains for 20-30 hours, and is then stirred. Grain in lightly packed mounds is the most satisfactory. If, after raking over the mound, the grain surface glistens with moisture, it is evidence that the dressing is not complete. In such a case the grain should be kept another 10-12 hours in the heap and again raked. The next day the grain is sown (with any type of machine) at a depth corresponding to the soil's moisture layer. The paper contains a record, from various State farms, of the improved yields (ranging between 1 and 4·6 c./ha. = 100 and 460 kg./ha.) obtained with treated grain (compared with untreated) of wheat varieties which include Hordeïforme 189, Caesium 111, Milturum 321 and Akmolinka 1, and also the barley varieties Precocious 143 and Rjadovoĭ. The augmented yields were obtained from sowings made on black-earth, argillaceous soils and other types. —M.H.

848 Cherewick, W. J. **Smut diseases of cultivated plants in Canada.** *Publ. 887. Canad. Dep. Agric.* 1953, pp. 58, bibl. 165, illus.

Notes are given on the control of smut disease by seed treatment. Data show the reaction of cereal varieties to different races of smut.—P.J.B.

849 Williams, J. G. **The quelea threat to Africa's grain crops.** *E. Afr. agric. J.* 1954, **19,** No. 3, 133-6, illus.

The natural habitat, feeding and breeding habits of queleas are described. From the records available, it appears that serious infestation of farming areas has always followed drought conditions in the birds' normal haunts. Control measures and problems are discussed.—C.L.S.

850 Revay, I. Vplyv jarovizácie a granulovan-

ého superfosfátu na zvyšovanie hektárových úrod obilovín. [**The influence of vernalization and granulated superphosphate in increasing the per hectare yields of grain crops.**] *Social. Zeměd.* 1954, **4,** No. 2, 140-8. [Czechoslovakia]

851 United States Department of Agriculture. **The test weight per bushel of grain : methods of use and calibration of the apparatus.** *Circ. 921. U.S. Dep. Agric.* 1953, pp. 11, illus.

852 Oxley, T. A. **Grain storage without drying.** *Agric. Merch.* 1954, **34,** No. 5, 167-70, illus. [D.S.I.R., Pest Infest. Lab., Slough]

Information is given on methods of storing grain with a high moisture content which are under study, or have been already adopted to a certain extent, in various countries. The first method, chemical treatment, has not yet shown great practical possibilities. The second, air-tight storage, developed mainly in France, is based on the principle that micro-organisms, especially fungi, which cause deterioration in damp grain, are killed by the depletion of oxygen and the production of carbon dioxide in the intergranular atmosphere. Air-tight storage was effective in preserving wheat for milling at 16·3% moisture content for an experimental period of 19 months in France. Trials to study air-tight storage are being carried out at the above laboratory in England. The odour which grain develops in air-tight storage is usually partially or completely dissipated by subsequent ventilation or drying, and the grain can then be used for all purposes except seed or malting. A third method, cool storage, consists in ventilating the grain only when the outside air temperature is low. It is used successfully in a store for 6000 tons at Malmö, Sweden, and is thought to be of interest for Great Britain. It is concluded that there are possibilities of raising the safe moisture content of stored grain by the methods described but that drying will still be necessary for very moist grain.—E.B.O.

853 Hall, D. W. and Hyde, Mary B. **The modern method of hermetic storage** [**for grain**]. *Trop. Agric. Trin.* 1954, **31,** No. 2, 149-60, bibl. 5, illus. [D.S.I.R. Pest Infest. Lab., Slough]

The principles of the hermetic storage of dry and damp grain are discussed. In tropical countries, dry grain is frequently stored in vapour-proofed concrete pits, hermetically sealed. In France and French Union territories, grain with moisture contents of 18-19% is successfully stored in airtight above-ground silos made of welded steel ; such grain is suitable, after storage, for bread-making, but, in a case where germination was tested, the grain was found to be of low viability. An experiment in progress with welded-steel silos is described. Further experiments are needed to determine whether welded-steel silos can be successfully used for the storage of damp grain in the tropics. Grain with a moisture content of less than 13% has been stored in good condition for several years in vapour-proofed concrete-lined pits. It is thought unlikely that grain with a moisture content above 15% can be successfully kept in pits ; the latter are less air-tight than welded-steel silos.—W.J.B.

854 Zeleny, L. **Methods of grain moisture measurement.** *Agric. Engng, St. Joseph, Mich.* 1954, **35,** No. 4, 252-6, bibl. 20. [Stand. and Test. Br., Grain Div., Agric. Mktng Serv., U.S. Dep. Agric.]

The following methods of determining the moisture content of wheat grain are reviewed individually : oven-drying, drying with desiccants, methods using distillation, chemical methods, methods based on the measurement of relative humidity and the use of electric moisture meters.—P.J.B.

855 Bennett, A. and Hudson, J. R. **Determination of moisture in cereals : review of methods in common use.** *J. Inst. Brew.* 1954, **60,** No. 1, 29-34, bibl. 47.

## LEGUMES

### SOYABEAN

856 Chappell, W. E. **Chemical vs. cultural control of weeds in soybeans.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 301-6, bibl. 3. [Virginia Agric. Exp. Sta., Blacksburg]

CIPC, DNOSBP and PCP were applied to soyabeans at rates of 6, 6·5 and 18 lb. per ac., respectively, either at sowing time or 4 days after sowing. These treatments were combined with : (a) late cultivation, (b) cultivation half-way through the growing season and also late, and (c) cultivation in the early, middle and late parts of the growing season. The herbicides were applied in 40 gal. water per ac. About 0·5 in. of rainfall fell one day after sowing and rainfall was normal for Virginia during the first 6 weeks of growth ; thereafter it was dry. All herbicide treatments gave good weed control, though CIPC was slightly less effective than PCP or DNOSBP. Crop injury was greater where the herbicides were applied 4 days after sowing than where they were applied at sowing. Weed control was improved by delaying herbicidal application for 4 days after sowing in the case of DNOSBP and PCP, but not CIPC, which may have been due to the relatively greater residual action of PCP and DNOSBP. Yields were greatly increased where cultivation in the middle and towards the end of the growing season were carried out, compared with where one late cultivation was done. Clear trends as to the relative effectiveness of early + middle-season and late-season cultivations were not evident. Where PCP and DNOSBP were applied, more than 2 cultivations reduced yields ; with CIPC and on untreated plots, the opposite was true. Very few weeds were evident at any time on plots treated with DNOSBP and PCP. Soyabean yields increased in direct proportion to the degree of weed control.—P.J.B.

857 Johnson, H. W. and Kilpatrick, R. A. **Autumn treatment of soybean seed.** [Abstract] *Phytopathology* 1953, **43,** No. 9, 476.

Trials in Mississippi showed that soyabean seed treated in the autumn with fungicides had significantly higher emergence during the following spring, than untreated seed. From these results, it was considered practicable to administer seed treatments during seed cleaning in the autumn, rather than during the following spring.—P.J.B.

858 Crittenden, H. W. **Effect of clean fallow in root knot development on soybeans.** [Abstract] *Phytopathology* 1953, **43,** No. 7, 405.

In trials in Delaware, a loamy sand soil was prepared on 1 May. Plots were kept in bare fallow by cultivation every 2 weeks. Soyabeans were sown on these plots on the following dates : 15 May, 1 June, 15 June and 1 July. The plots were not cultivated after sowing. Root-knot nematode indices (100 = maximum infection) taken 90 days after sowing on plots sown on 15 May, 1 June, 15 June and 1 July were 50, 56, 17 and 4, respectively. The root-knot indices of plants sown on 1 July on plots not fallowed averaged 40. These results showed that, on the soil type used, cultivation during June markedly reduced root-knot nematode numbers.—P.J.B.

859 Milner, M. and Thompson, J. B. **Grain storage. Physical and chemical consequences of advanced spontaneous heating in stored soybeans.** *J. agric. fd Chem.* 1954, **2,** No. 6, 303-9, bibl. 39. [Kansas State Coll., Manhattan]

## GROUNDNUT

860 Organization For European Economic Cooperation. **The cultivation of groundnuts in West Africa.** *Publ. TAR/114(53)1. OEEC* 1953, pp. 54, illus.

This publication was prepared from material collected by a 5-man mission under the auspices of OEEC, convened to study the general problems of groundnut cultivation in West Africa. Territories visited included Nigeria, Senegal, Portuguese Guinea and the Gambia. Each territory is reviewed separately, with notes on transport facilities, production statistics, current methods of groundnut production and recommendation for the possible expansion of production.—P.J.B.

861 Sauger, L. Méthode de délimitation des zones d'adaptation des lignées sélectionnées d'arachide au Sénégal. [**Method of delimiting the adaptation zones for selected groundnut varieties in Senegal.**] *Agron. trop.* 1954, **9,** No. 1, 21-7, map. [Cent. Rech. Agron., Bambey, Sénégal]

The groundnut varieties selected at the Centre de Recherches Agronomiques, Bambey, are first tested for yield at the agricultural stations and then on native farms, in a great number of localities throughout the principal agricultural zones of Senegal. The results from these adaptation studies are shown in charts in which adaptation curves indicate, on the geographical map of the region, the zone suitable for each variety. A list is given of these selected varieties. In the 1952 trials, a conservative estimate indicated an average increase of 25% in groundnut yields from replacing the common varieties with selected varieties.—E.B.O.

862 Ollagnier, M. Recherches sur la nutrition minérale et la fumure de l'arachide en Haute-Volta. [**Investigations into the mineral nutrition and manuring of groundnuts in Haute-Volta (French West Africa).**] *Oléagineux* 1954, **9,** No. 3, 155-8. [Inst. Rech. Huiles et Oléagineux]

863 Ferrand, M. La fumure de l'arachide en Afrique tropicale. [**Groundnut manuring in tropical Africa.**] *Rev. int. Bot. appl.* 1953, **33,** No. 373-4, 479-89, bibl. 8. [Inst. Rech. Huiles et Oléagineux]

864 Hodnett, G. E. **A uniformity trial on groundnuts.** *J. agric. Sci.* 1953, **43,** Pt 3, 323-8, bibl. 2. [Rothamsted Exp. Sta., Harpenden, Herts]

Analyses of a uniformity trial with groundnuts, carried out at Kongwa, Tanganyika, are presented. Plant numbers were less variable than yields and less affected by shape of plot and block. For yields, long, narrow plots were more efficient than shorter and wider plots, in all shapes and sizes of blocks and in Latin squares. Arranging plots side by side along the contours, either singly or in pairs, forming compact blocks was more satisfactory than arranging them end to end along the contours. The regression of the plot variance of the mean yield per unit area on size of plot, followed approximately a linear logarithmic relationship. A similar relationship held for plant numbers. There was a considerable gain from the use of small blocks.

The efficiencies of various confounded and incomplete block designs relative to designs in larger blocks were determined for a number of layouts, and values for other layouts, ignoring shape of plots and of blocks, were obtained by interpolation. —From author's summary.

## PEA

865 Smolin, A. A. [**Possibilities of growing peas in Kazah SSR.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 2, 109-11.

866 Netherlands. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 156. Ronde groene erwten, 1954. [**Choice of varieties. Pamphlet No. 156. Round-seeded peas for picking green, 1954.**] *Suppl.* 4. *LandbVoorl.* 1954, **11,** No. 2, 1-4. [Wageningen]

Rondo C. B. outyielded all other established varieties in regions where Fusarium foot-rot was prevalent but was outyielded by C. B. 4218, a variety still under trial.—W.J.B.

867 Netherlands. Peulvruchten Studie Combinatie. Resultaten van het doperwtenrassenonderzoek oogst 1952. [**Results of green pea variety trials, 1952.**] *Tech. Ber. 62. Peulvrucht. Stud. Comb. Wageningen* 1953, pp. 28.

The results of the trials with numerous varieties of green peas for canning are tabulated under the heads: disease-resistance; length of straw; straw stiffness; susceptibility to frost; yield of usable peas; thousand-pea weight; earliness; evenness of ripening; suitability for factory-processing; quality after preserving in tins.—W.J.B.

868 Hagedorn, D. J. **New Era, a recently developed disease-resistant canning pea.** [Abstract] *Phytopathology* 1953, **43,** No. 9, 473. [Univ. Wisconsin, Madison]

New Era is an " Early Perfection " type of canning pea, which is 2-3 days earlier in maturity than normal Perfection varieties and which has a relatively wide range of adaptation and high yields. It is resistant to *Fusarium oxysporum* f. *pisi* Races 1 and 2 and to bean virus 2, a widespread disease in Wisconsin.—P.J.B.

869 Wainstein, P. Estudio comparativo sobre variedades de arveja. [**Comparative studies on pea varieties.**] *Publ. 6. Minist. Agric. Argent. Cent. Reg. Andino de Invest. Agropec.* 1953, pp. 11, bibl. 8, illus. [Substa. Exp. " La Consulta ", Mendoza, Argent.]

A comparative study was made of pea varieties for canning in the Mendoza region and of suitable methods of growing them. The optimum sowing-season was between the beginning of July and mid-August. Seeds were sown in rows 0·6 m. apart for dwarf varieties and 0·8 m. apart for other varieties. Distances between plants of 2·5 cm. for dwarf varieties and 5·0 cm. for other varieties gave the best yields. The varieties Perfection, Wisconsin Perfection, Prince of Wales and Holandesa were outstanding for their yields and canning quality.—W.J.B.

870 Riepma Kzn, P. Chemische onkruidbestrijding in erwten. [**Chemical control of weeds in pea-crops**] *LandbVoorl.* 1954, **11,** No. 3, 121-4, bibl. 3. [Cent. Inst. Landbouwk. Onderz., Wageningen, Neths]

Two sets of experiments (at Wageningen and in interprovincial trials) dealing with the effect on the yield of peas of DNBP, DNOC, TCA, MCPA and calcium cyanamide, applied at various growth-stages, are reported. MCPA (0·5 kg. active material per ha. applied to peas 8 and 20 cm. high) and TCA (10 and 15 kg. per ha. applied before and after emergence) caused reductions of about 300 kg. per ha. in the yield of peas when applied to weed-free crops. The effect on the yield of peas of DNOC, applied before emergence at the rate of 5 kg. per ha., was not consistent, but the differences between the yields from the weed-free plots of peas treated with DNOC and those from untreated weed-free plots were slight. DNBP (0·98 kg. active material per ha.) gave increases in the yield of peas on weed-free plots of about 200 kg. per ha. whether applied early, when the peas were 5 cm. high, or late, when they were 20 cm. high. Calcium cyanamide, applied at the rate of 250 kg. per ha. to weed-free plots of peas, gave results which varied with the time of application and the location of the plots. It is recommended that calcium cyanamide should be applied at the time of emergence, and when the plants are dry, on clay and loamy soils, but not on sandy soils.—W.J.B.

871 Noll, C. J. and Odland, M. L. **Weeding of cannery peas with herbicides.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 127-30, bibl. 1. [Pennsylvania Agric. Exp. Sta., State College]

The results are given of trials during one year in Pennsylvania, on the use of pre- and post-emergence herbicidal treatments to control weeds in peas. CMU at 1 lb. per ac. and CIPC at 1 gal. per ac. gave the best results in terms of weed control, pea yield and absence of damage to the crop. Almost equally good were Weedar MCPA at 0·25 gal. per ac. and LFN-904 (2 lb. MCPA ester formulation per gal.) at 0·5 gal, per ac. Endothal gave very poor weed control. Cyanamide, applied at a rate of 400 lb. per ac. when the pea plants were emerging, resulted in significantly higher pea yields than untreated controls, did not damage the plants and gave good weed control. Post-emergence treatments were applied when the crops were 6 in. high. ACP-L-423 (amine salt of 4-chlorophenoxyacetic acid) at 0·5 gal. per ac. resulted in severe crop injury. Dow Selective (ammonium salt of DNOSBP) resulted in significantly more leaf burn than Premerge (amine salt of DNOSBP), both applied in 25 gal. spray volume per ac. The best post-emergence treatment was Premerge applied at 0·25 gal. per ac. in 25 gal. water.—P.J.B.

872 Marshall, E. R. and Curtis, L. E. **Weed control in peas with various herbicides.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 131-5. [G.L.F. Soil Build. Serv., Ithaca, N.Y.]

The results are given of trials during 1953 to compare a number of herbicides used as pre-emergence treatments. Materials used included : CMU, PDU (phenyl dimethyl urea), Sinox PE (alkanolamine salt of DNOSBP), Crag Oxalate (bis dichloro phenoxy ethyl oxalate), Natrin (2, 4, 5-trichlorophenoxyethyl sulphate), 4 Chloro (amine salt of 4 chlorophenoxyacetic acid), Hydrin (2 methyl, 4 chlorophenoxyethyl sulphate), 2,5-D sulphate (2,5-dichlorophenoxy ethyl sulphate) and amino triazole. All materials were applied in 25 gal. spray volume per ac. Best results in terms of weed control and lack of injury to the peas followed the use of Sinox PE at a rate of 1-2 gal. per ac. applied during the period from sowing up to one day before emergence. CMU and PDU gave good weed control, but caused some injury to the crop. Crag Oxalate gave erratic weed control and caused some injury to the crop. The amine salt of 4-chloro phenoxyacetic acid at 3 and 4 lb. per ac. gave good weed control, but injured the crop. Hydrin gave good control of emerged weeds, but had poor residual effect. MCP sulphate and 2,5-D sulphate gave poor weed control on the plot soil (heavy loam). Amino triazole gave excellent weed control at 8 lb. per ac., but caused stunting in the crop, which lasted up to the time of harvest. Natrin at 4 lb. per ac. gave weed control equivalent to Sinox PE at 6 lb. per ac., but caused some injury to the crop. In further trials, pre-emergence, emergence and post-emergence treatments with Sinox PE, Crag Oxalate, CMU and PDU were made. Pre-emergence treatments with 1·5 and 3 lb. Sinox PE per ac. gave good weed control, which lasted until harvest and caused no injury to the crop. As an emergence treatment, 0·5-1 gal. of Sinox PE per ac. and as a post-emergence treatment, 1·5 qt. Sinox PE per ac., gave good weed control and caused little injury to the crop.—P.J.B.

873 Cooke, G. W. and Widdowson, F. V. **Placement of fertilizers for row crops.** *J. agric. Sci.* 1953, **43,** Pt. 3, 348-57, bibl. 3. [Rothamsted Agric. Exp. Sta., Harpenden, Herts]

In trials in the Eastern Counties during 1949-51, the following manurial treatments were given to peas, for harvesting both dry and green, and to autumn- and spring-sown beans : (a) broadcast early and worked deeply into the seed bed, (b) broadcast on the seed bed and harrowed-in lightly, (c) placed in bands 3 in. below the surface and 2 in. to one side of the seed, (d) half broadcast early and half placed in bands beside the seed, (e) half broadcast on seed bed and half placed in bands beside the seed. Manures used contained P + K and the rate of application ranged from 2·3-7 cwt. per ac. Band placement had no effect on seed germination at any location. In about one-quarter of the trials, manures applied by method (a) resulted in significantly higher yields than those applied by (b). In about one-third of the trials, band placement resulted in significantly higher yields than broadcasting. Broadcasting manures resulted in small increases in dry years and relatively larger increases in wet years. Mean yield increases where manures were broadcast were 0·7, 2·9, 1·5 and 0·6 cwt. per ac. for dry peas, green peas, winter beans and spring beans, respectively ; mean yield increases where the manures were placed in bands were 1·8, 9·3, 1 and 1·3 cwt. per ac., respectively. Yield increases following band placement of manures were highest for spring-sown crops. Broadcasting half the manure and placing half in bands resulted in no consistent yield increases over the treatment where all the manure was placed in bands. In almost all cases, band placement with given rates of manure resulted in yields at least as high as those where double the rate of manure was broadcast. The results confirmed conclusions reached previously that band placement of manures was of particular value to crops with a short growing period and limited root range. In trials with carrots, kale, beetroot and spinach, only in the case of spinach did band placement give significantly higher yields than broadcasting.—P.J.B.

## BEAN

874 Picard, J. and Félix, L. La culture de la féverole dans la région parisienne. Résultats d'essais réalisés en 1952 et 1953. [**Growing horse beans** (*Vicia faba*) **in the region of Paris. Results of trials made in 1952 and 1953.**] *C. R. Acad. Agric. Fr.* 1954, **40,** No. 3, 123-9. [Sta. Amélior. Pl., Versailles]

An account is given of varietal trials in which a North African, a Dutch, a Swedish, and 3 French varieties of *Vicia faba* were grown in comparison with Strube's, an early, fairly large-seeded German variety. While final conclusions are not yet available, the importance of choice of variety and of date and density of sowing has emerged. An early, large-seeded variety entails much less risk than a late, small-seeded variety.—G.M.R.

875 VIETS, F. G. and others. **Zinc content of bean plants in relation to deficiency symptoms and yield.** *Pl. Physiol.* 1954, **29,** No. 1, 76-9, bibl. 7, illus. [U.S. Dep. Agric. and State Coll. Washington, Prosser]

Zinc deficiency symptoms in field-grown, Red Mexican beans (*Phaseolus vulgaris*) are described. The observation of deficiency symptoms in seedlings soon after emergence is explained by the low Zn content of the seed. Analysis of plants with different levels of Zn supply, as judged by deficiency symptoms and fertilization experiments, showed that all vegetative parts had a wide range in Zn content. The youngest tissue showed the greatest range. Deficiency symptoms are associated with about 20 ppm. Zn, or less, in the mature leaves or the whole top. Plants fertilized with 11·6 lb. Zn per acre at planting contained more Zn in all plant parts than did unfertilized plants. Concentrations of Cu, P, K, Mg and Ca were not significantly affected. Substantial increases in dry bean yields were obtained by fertilizing with $ZnSO_4$, even though Zn deficiency symptoms were not apparent on unfertilized plants. P and Zn showed similar patterns of distribution, being highest in young tissues and lower in mature leaves, old leaves and stems. Cu, Mg and Ca were highest in mature leaves.—From authors' summary.

876 SWANSON, C. A. and WHITNEY, J. B. **Studies on the translocation of foliar-applied $P^{32}$ and other radioisotopes in bean plants.** *Amer. J. Bot.* 1953, **40,** No. 10, 816-23, bibl. 15, illus. [Univ. Tennessee, Oak Ridge]

The paper contributes additional data on the influence of temperature on the movement of inorganic constituents (or their metal-organic derivatives) in the phloem. The material was *Phaseolus vulgaris* var. Black Valentine. " The influence of petiole temperature on the rate of distribution of foliar-applied $P^{32}$, $K^{42}$, $Ca^{45}$, and $Cs^{137}$ [caesium] was studied. Marked inhibition of translocation by low petiole temperature was observed amounting to 85% or more at a temperature of about 5°C. The optimal temperature, for 4-hr. translocation periods was usually near 30°C. ; higher temperatures causing a decline. Temperature also exerted a direct and marked effect on the amount of radioisotope accumulated in the temperature-treated petiole itself, the optimum temperature being higher than for translocation, usually above 40°C. Localized low temperatures on the stem were also found to retard markedly the translocation of foliar-applied $P^{32}$ to portions of the plant below the temperature zone. Low stem temperatures, on the other hand, did not retard upward movement of $P^{32}$ through the stems when the radioisotope was supplied via the roots. Killing a 5-mm. zone on the petiole by steaming completely stopped the outward movement of $P^{32}$, $K^{42}$ and $Cs^{137}$ from the leaf. Experiments employing simultaneous applications to the leaves of $P^{32} + K^{42}$, and $P^{32} + Cs^{137}$, indicated independent and different rates of movement in the phloem."—D.B.

877 MITCHELL, J. W. and others. **Movement of streptomycin in bean plants.** [Abstract] *Phytopathology* 1953, **43,** No. 9, 480.

## OTHER

878 RIVALS, P. Le dolique d'Egypte ou lablab (*Dolichos lablab* L.). [**Egyptian kidney-bean or lablab (*Dolichos lablab* L.).**] *Rev. int. Bot. appl.* 1953, **33,** No. 373-4, 518-37, bibl. 44, illus. [Fac. Sci., Toulouse, France]

In this second and last part of the article, a new classification of sub-species and of wild and cultivated varieties of lablab is proposed. A study of the conditions of flowering of a number of lablab varieties at Toulouse, France, and in Réunion Island (lat. 21° S.), showed that some were short-day varieties (appropriate photoperiod for flowering 10-11 hr.), that others were relatively unaffected by day length (appropriate photoperiod 12-15 hr.), and that only one long-day variety was present (appropriate photoperiod nearly 16 hr.). The possibility of growing successfully short-day varieties of lablab as a summer cover-crop, for green manure and forage in temperate countries is considered. The growing of lablab for seed in these same countries is economically possible only in southern districts and by employing the few known varieties which flower at the beginning of July. [See also *Fld Crop Abstr.* 7 : 509.]—E.B.O.

879† HURWITZ, S. and GABRIELITH-GELMOND, H. **Hardening of sweet lupin seeds.** [Hebrew] *Ktavim* 1952, 2-3, 57-64, bibl. 9, English summary p. 13.

*Lupinus luteus* is harvested in Israel during April and May and the seeds harden in storage during the summer months. The factors involved in hardening have been studied. Seeds were stored under the following range of conditions ; in a desiccator over calcium chloride and without desiccation, both at room temperature and in a refrigerator at 12° C ; in a cellar, in a perforated wooden box sunk in the ground, and in a heap of unthrashed pods. After two months of storage, partial transfers were made from the sunken box into a room, from room temperature to the refrigerator, and from the refrigerator into a bell-jar saturated with water vapour. Germination tests were carried out month by month and the rate of the delay factor was determined. It was noted that seeds do not harden as long as they are attached to the mother plant. The germinability of seeds stored in the refrigerator remained almost unaffected throughout the experimental period. Desiccation resulted in rapid hardening at all temperature levels. Storage in the cellar gave satisfactory results. Storage of pods in a heap resulted in rapid and intense hardening of the seeds. Consequently, the germination percentage fell within three weeks from nearly 100 per cent to about 15 per cent. Softening set in during the autumn and, by the end of November, with the approach of the sowing season, germination power was recovered to the extent of over 70 per cent. The experimental results indicate that the factor mainly responsible for seed hardening is air dryness and not high temperature. The hardening process appears to be conditioned by the palisade tissue of the seed-coat, which becomes rigid and impervious to water.—From authors' summary.

880 NAIK, M. S. and NARAYANA, N. **Riboflavin in gram [chickpea] seedlings.** *Curr. Sci.* 1954, **23,** No. 4, 123-4, bibl. 1. [Chem. Res. Lab., Coll. Agric., Poona, India]

Seeds of chickpea (*Cicer arietinum*) were germinated in bright sunlight, diffused daylight and total darkness and periodically assayed for riboflavin content by the microbiological method. Light had an inhibiting effect on the formation of riboflavin. The concentration of riboflavin in the plumule and radicle was much greater than in the cotyledons.—W.J.B.

881 STEHLÉ, H. Étude botanique et agronomique des légumineuses autochtones et exotiques de genres *Canavalia*, *Clitoria* et *Crotalaria* aux Antilles françaises. [**A botanical and agronomical study of native and introduced legumes of the genera *Canavalia*, *Clitoria* and *Crotalaria* in the French Antilles.**] *Rev. int. Bot. appl.* 1953, **33,** No. 373-4, 490-517, bibl. 36. [Cent. Rech. Agron., Antilles, Fr.]

A key is given for the identification of 4 species of *Canavalia*, 2 species of *Clitoria*, 16 species of *Crotalaria*, and some varieties of these species. The species studied are of interest for one or more of the following uses: green manuring, cover cropping, erosion control, forage or fibre production. The genus *Crotalaria* is the most important. Some of its species, mainly *C. juncea*, are of interest for fibre production. The information given on each species includes: a brief description, vernacular names in several languages, synonyms, geographical distribution and uses. Information is also given on legumes belonging to other genera. There are tables showing the yield of green matter and seed of several legumes tested in 1952. Some native species, e.g. *Crotalaria verrucosa* as green manure, and *Clitoria rubiginosa* grown as a cover crop and for erosion control, are considered superior to many valuable introduced species.—E.B.O.

882 ZAGORODNYĬ, G. P. [**Green manures for irrigated farming in Dagestan.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 105-6. [Dagestan Agric. Inst.]

An account is given of tests carried out on experimental plots of the above Institute from 1946 to 1950 on more than 30 species of legumes grown for green manure.—M.H.

883 BAILEY, E. T. **Agronomic studies of vetches and other large-seed legumes in southern Western Australia.** *Tech. Pap. 1. CSIRO Div. Pl. Industr.* 1952, pp. 21, bibl. 11. [Received 1954]

A number of species of *Lathyrus*, *Lupinus*, and *Vicia* were introduced from overseas and grown at several centres in southern Western Australia. Those which appeared promising as high-protein grain crops for the 15-25 in. rainfall belt were multiplied and their agronomic characters compared with varieties of *Pisum sativum* in replicated field trials. Observations were also made on their resistance and susceptibility to the depredations of the pea weevil (*Bruchus pisorum*) and the red-legged earth mite (*Halotydeus destructor*). Two strains of *Vicia articulata*, "La Fayette" and "Monala", and one strain of *Vicia sativa* were superior in yields of grain and fodder and in resistance to insect attack to standard varieties of peas. —Author's summary.

884† LECHNER, L. Ergebnisse der Hülsenfrucht-Importsaatversuche 1952 an der Bayerischen Landessaatzuchtanstalt Weihenstephan bei Freising/Obb. [**Results of 1952 trials of imported legume seed at the Bavarian Seed Production Station, Weihenstephan, in Freising, Upper Bavaria.**] *Saatgutwirtschaft* 1954, **6,** No. 1, 9-11, illus.

The quality and performance of summer vetch, peas, and white, blue and yellow lupin imported from various European countries are presented in tables. As regards yields of seed and of hay, the 1952 seed showed a general improvement on that imported in 1951. The most variable character is the 1000-seed weight which influences the seeding rate and the cost of seeding.—D.B.

885† HOLMES, P. **The amino-acid composition of certain seed proteins.** *Aust. J. exp. Biol. med. Sci.* 1953, **31,** Pt. 6, 595-602, bibl. 31. [Inst. Agric., Univ. W. Australia]

From the whole protein preparations of seeds of the lupin (*Lupinus pilosus*), pea (*Pisum sativum*), vetch (*Vicia sativum*), subterranean clover (*Trifolium subterraneum*) and linseed (*Linum usitatissimum*), 15 amino-acids were determined by paper chromatography. The non-protein nitrogen fraction ranged from 10-20% of the total nitrogen present. Based on the degree to which the essential amino-acid contents differed from those of whole egg protein used as a standard, the nutritive value of the protein sources examined decreased in the following order : lupin, vetch, linseed, pea and subterranean clover. The comparative methionine deficiency of the legume seeds was confirmed and it was established that iso-leucine was also generally deficient in leguminous seeds and ranked next to methionine in significance.—C.L.S.

## ROOTS

### SUGAR-BEET

886 Hauser, G. F. **Sugar-beet cultivation in Afghanistan and its improvement.** *Emp. J. exp. Agric.* 1953, **21,** No. 84, 283-8.

Field trials in the Baghlan district are described in which sowing sugar-beet in rows on the flat was compared with the method customarily used in Afghanistan of sowing sugar-beet on the ridge. Irrigation water was applied to all plots in the experiment. Over the two years of the experiment, sowing on the flat gave increases of 30-35% in the yield of sugar over the native method of sowing on the ridge. Sowing on the flat required less labour than sowing on the ridge.—W.J.B.

887 Rapin, J. La culture de la betterave à sucre en altitude. [**Sugar-beet growing at high altitudes.**] *Rev. rom. Agric.* 1954, **10,** No. 2, 11-12. [Sta. Féd. Essais Agric., Lausanne]

Sugar-beet trials were made at the Experiment Farm of La Frétaz in the Jura for the first time in 1953. The altitude is 1200 m. Although conditions were especially unfavourable in 1953, good results were obtained. Sugar content was satisfactory in Hilleshög K and Kuhn P, while all the sowings were entirely free from yellows and *Cercospora beticola*.—G.M.R.

888 Simon, M. L'importance de la densité de plantation pour le rendement de la betterave sucrière. [**The importance of density of planting for yields of sugar-beet.**] *Publ. Vulg. Inst. belge Amélior. Better.* 1954, No. 1, 5-20, bibl., illus.

This paper, written for the sugar-beet grower, recommends 75,000, rather than the usual 55,000-65,000, plants per ha. as the optimum density. This density results in higher yields per acre of root and tops, a higher sugar content, fewer weeds, less bare soil, and less infection by virus yellows.—D.B.

889 Netherlands. Commissie ter Bevordering der Suikerbietenteelt in de Noordelijke Provinciën. Het op voorraad lichten van bieten. [**The effect of a delay between lifting and harvesting sugar-beet.**] *Meded. Inst. rat Suikerprod.* 1953, **23,** No. 183, 200-2. [Inst. Rat. Suikerprod., Bergen op Zoom, Neths]

The effect on sugar content of leaving lifted, untopped beet in the field for a period of 1-5 weeks before harvesting was studied. On 3 October, 1952, freshly lifted and unlifted sugar-beet both yielded 74 kg. of sugar per are [= 120 sq. yd. approx.]. By 24 October, the beet which had remained in the ground yielded 76 kg. of sugar per are while the beet lifted on 3 October and left untopped in the field yielded 78 kg. per are. By 31 October, comparable figures for the unlifted and lifted beet were 86 and 84 kg. of sugar per are, respectively. Thus for the first 3 weeks after lifting the increase in the yield of sugar per are was greater in the case of lifted beet than in that of beet left unlifted. Field conditions during the experiments were wet.—W.J.B.

890 Industria Saccarifera Italiana. La valorizzazione della bieticoltura nell'Italia centrale. Ricerche sperimentali ed orientamenti nella pianura di Cecina. [**Sugar-beet cultivation in central Italy. Investigations in the Cecina Plain.**] *Industr. saccar. ital.* 1954, **47,** No. 1-2, 6-13.

The Cecina Plain is one of the areas of central Italy where the possibility of developing sugar-beet cultivation is under study. In trials to test 16 Italian and foreign sugar-beet varieties, Desprez Elite, Maribo P, Klein N and Diekmann's Z yielded best with 6200, 6090, 6020 and 6000 kg. of sugar per ha., respectively.—E.B.O.

891 Wauthy, R. and Roussel, N. Les résultats des essais de variétés de betterave sucrière en Belgique de 1948 à 1953. [**Results of sugar-beet varietal trials in Belgium from 1948 to 1953.**] *Publ. Inst. belge Amélior. Better.* 1953, **21,** No. 4, 109-21, bibl. [Inst. Better., Tirlemont, Belgium]

892 Parguey, G. and Martin, S. La production des graines de betteraves en Beauce. [**Beet seed production in Beauce (France).**] *Bull. tech. Inform.* 1953, No. 84, 775-86, illus.

Information is given on the cultivation of beet for seed, (both sugar- and fodder-beet), in the Eure-et-Loir. Seed-beet was grown on an area of 5000 to 6500 ha. in 1944-51, but this area was reduced considerably in the following years. The growing of stecklings, which are taken up between 15 November and 15 December, and their conservation in silos, is described. The stecklings of sugar-beet are sorted and planted about 1 March and those of fodder-beet, which are more susceptible to frost, about 15 March. Seed-beet is generally grown in the first year in a 3-course rotation, before wheat. The direct growing of mother plants of sugar-beet, (without lifting, storing and re-planting the stecklings) is under study. Although the yields obtained by this method are comparable with those obtained by the usual method, the direct growing method has several disadvantages.—E.B.O.

893 Melis, A. and Marinari, Anna. Esperienze di lotta contro il cleono della bietola (*Temnorrhinus mendicus* Gyll.) nel 1953. [**Trials for controlling *Temnorrhinus mendicus* on sugar-beet in 1953.**] *Industr. saccar. ital.* 1954, **47,** No. 1-2, 14-26, illus.

The insecticides based on BHC, Heptachlor, Aldrin and Dieldrin were effective. [See also *Fld Crop Abstr.* 6 : 1011.]—E.B.O.

894 Coons, G. H. **Resistance of sugar beets to virus yellows.** [Abstract] *Phytopathology* 1953, **43,** No. 7, 405.

In trials in Oregon, the inbred sugar-beet strains U.S. 201-B, NB6-56, SL 0502, SL 0504 and SL 8255 were almost free of virus yellows after exposure to severe infection. Trials with the 4 last-named strains (which are resistant to curly-top virus) in California gave similar results. Resistance to virus yellows in sugar-beet varieties in Europe has not yet been demonstrated.—P.J.B.

895 Baratte, J. A propos de quelques observations faites sur la jaunisse de la betterave. [**Some observations on beet yellows.**] *C. R. Acad. Agric. Fr.* 1953, **39,** No. 16, 759-60.

Since the young foliage of the beet is apparently especially attractive to the insect vectors of virus yellows, the usefulness of a trap strip of beet, arranged around a field and planted later than the rest of the crop, is suggested.—G.M.R.

896 Bonnemaison, L. Protection des betteraves et notamment des porte-graines contre la jaunisse. [**Protection of beet, and especially of the seed-bearing plants, against yellows.**] *C. R. Acad. Agric. Fr.* 1953, **39,** No. 16, 752-9, bibl. 4. [Sta. Cent. Zool. Agric.]

Advice to growers is based on a study of the life cycle of the insect vectors transmitting yellows. It is advisable to sow for roots early ; stecklings for seed should be planted about 15 July. For the grower who prefers to plant stecklings in the spring, the use of cover crops and insecticides is discussed.—G.M.R.

897 Wenzl, H. and Krexner, R. Versuche zur Bekämpfung der Vergilbungskrankheit der Rübe. [**Experiments in the control of sugar-beet yellows.**] *PflSchBer.* 1954, **12,** No. 7/8, 105-28, bibl. 24. [Bundesanstalt für Pflanzenschutz, Vienna]

Following a literature review on the use of different agents for controlling sugar-beet yellows, an account is given of tests made with Systox, a relatively cheap systemic insecticide. Where the disease incidence was weak (up to 7% infected plants), three applications by spraying, each at the rate of 400 cc. Systox per ha., reduced the number of diseased plants by approximately half. Where there was a higher percentage of diseased plants the treatment was more effective. As regards cultivation measures, there is less infection when sugar-beet is sown in April or early May.—D.B.

898† Lona, F. Fioritura di *Orobanche* e *Cuscuta* su ospiti vegetativi. [**Flowering of *Orobanche* and *Cuscuta* on host plants in the vegetative stage.**] *Ateneo parmense* 1953, **24,** No. 3-4, pp. 8, bibl. 11, illus. [Ist. Bot. Univ. Parma, Italy]

Observations on *Cuscuta gronovii* growing on first year's sugar-beet plants, and on *Orobanche ramosa* growing on plants of *Perilla ocymoides* var. *nankinensis* and *Xanthium italicum* both kept under conditions unsuitable to flowering, indicated that both the *Cuscuta* and *Orobanche* plants flowered perfectly on host plants in the vegetative stage.—E.B.O.

899 Ernould, L. La végétation, les ennemis et maladies de la betterave, en Belgique, en 1953. [**The vegetative growth, pests and diseases of the beet in Belgium in 1953.**] *Publ. Inst. belge Amélior. Better.* 1953, **21,** No. 4, 123-59, bibl. [Inst. Better., Tirlemont, Belgium]

The growth of the sugar-beet, incidence of fungal and deficiency diseases and damage by pests, in Belgian beet fields in 1953 are correlated with the monthly weather reports.—D.B.

900 Sedlmair, K. [**Phasic development in beets.**] [Russian] *Acta agron. hung.* 1953, **3,** No. 4, 385-421, bibl. 56, illus., English and German summaries pp. 417-21.

In the first part of this work the author reviews the history of Lysenko's theory of phasic development ; in the second part the effect of new concepts on beet biology, breeding and seed production is examined. It is concluded that the study of phasic development satisfactorily explains the occurrence of first-year bolting and enhances the possibilities of rational seed production in beet.—From author's summary.

901 Pärnoja, E. **Methods of determination of amino acids in the sugar beet.** *Socker, Malmö* 1954, **8,** No. 8, 71-84, bibl. 77, illus. [Bot. Lab., Univ. Lund, Sweden]

Procedures are given for analyses of total soluble N, $NH_4$ N, amide N, betaine and amino acids, using paper chromatography and electrodialysis. A brief note is given on the collection and storage of samples for analysis.—P.J.B.

902 THORNE, G. N. **Absorption of nitrogen, phosphorus and potassium from nutrient sprays by leaves.** *J. exp. Bot.* 1954, **5,** No. 13, 37-48, bibl. 15, illus. [Rothamsted Exp. Sta., Harpenden, Herts]

Barley, Brussels sprout, French bean, tomato and sugar-beet plants grown in soil in pots and sprayed, usually daily, for several weeks, with nutrient solutions containing N, P, K, and a spreader, with precautions to prevent the spray solution falling on the soil, had higher nutrient contents and dry weights than control plants sprayed with water and spreader only. Increase in nutrient content occurred with high or low levels of nutrient supply to the roots and was approximately proportional to the concentration of spray and to the frequency of spraying. The nitrogen content of sugar-beet plants was increased equally by spraying with solutions supplying ammonium sulphate, calcium nitrate, or urea in equivalent concentrations. Nutrient uptake from solutions sprayed on leaves influenced uptake by the roots so that the additional amounts of nutrient contained in sprayed plants may be greater or smaller than the amount absorbed from the spray by the leaves.—Author's summary.

903 ROUSSEL, N. Résultats d'une expérience factorielle, effectuée en 1952, dans le but d'établir les relations entre le type de variétés, la fumure azotée minérale de la betterave sucrière et la date d'arrachage. [**Results of a factorial experiment carried out in 1952 to establish the interactions of variety, nitrogen applied and date of harvest in sugar-beet.**] *Publ. Inst. belge Amélior. Better.* 1953, **21,** No. 3, 87-106, bibl. 1, English summary p. 106.

Comparisons of nitrogenous dressings in the form of ammonium nitrate at the rate of 70, 120, 170 and 220 kg. of nitrogen per ha. showed 170 kg. to give the best results, heavier dosage reacting unfavourably on sugar content and root quality. Harvesting late, on 30 November, had a favourable effect on root yield, sugar content and sugar production, although the amount of crowns and leaves harvested was diminished. Late harvesting has, however, the disadvantage of increasing costs and of spoiling soil structure. The following interactions appear to exist : between date of harvest and variety in relation to yields of processed sugar and of tops ; between date of harvest and nitrogenous fertilizer in relation to the production of tops ; between variety and nitrogenous fertilizer and date of harvest in relation to yield of processed sugar.—G.M.R.

904 ROON, E. van. Het bewaren van pootbieten. [**Storage of beet stecklings.**] *LandbVoorl.* 1954, **11,** No. 2, 71-8, illus. [Cent. Inst. Agric. Res., Wageningen]

The advantages of storing sugar- and fodder-beet stecklings (for seed production) in open-air and indoor power-ventilated clamps, instead of in the normal " Groninger " clamps used in the Netherlands, are discussed. Stecklings stored in normal clamps tend to lose energy reserves through overheating in autumn and spring. The ideal temperature for storing stecklings is 3-6°C. The outdoor power-ventilated clamps are built over an air-channel, triangular in section and made of wooden slats. In autumn and spring when the clamps tend to become overheated, relatively cool air is pumped through the clamp, via the air-channel, at times of the day or night when the air-temperature falls below the temperature of the clamp. Pipes are inserted at intervals in the top of the clamp to allow air under pressure to escape. Tests since 1949 showed that there was a greater recovery of useful stecklings from the clamps and a 10% greater yield of seed per given number of useful stecklings when power-ventilated, as compared with normal unventilated clamps were used ; also, more stecklings can be stacked in a given space and a thinner insulating cover of earth can be used when outdoor clamps are power-ventilated. Power-ventilated potato stores can also be used for storing stecklings.—W.J.B.

905 JAEHNL, G. Ertragsfeststellung und Probenahme in Rübenversuchen. [**Determination of yield and sampling in beet trials.**] *Veröff. Bundesanst. alp. Landw. Admont* 1954, No. 9, 1-9, bibl. 4.

Reference is made to former work [see *Fld Crop Abstr.* 4 : 774]. In 1950 and 1951, in varietal trials with sugar-beet, fodder-beet and half-sugar-beet grown in different places and at different altitudes the yield per hectare for each variety in each trial was calculated 3 times, namely, from 10 normal beets (Roemer's method, whereby 10 normal plants, in the vicinity of which there are no bare patches, are taken), from 10 beets lifted at random, and from the total yield of the plot. Three very divergent results were obtained, comparisons of which showed yield calculated from a few plants to be in every case too high, for sugar- and fodder-beet by an average of 27%, for half-sugar-beet by an average of 45%, for the leaves of sugar- and half-sugar-beet by 23 and 25% and for those of fodder-beet by 42%.—G.M.R.

## FODDER-BEET

906 SALZMANN, R. Sortenversuche mit Futterrüben. [**Fodder-beet varietal trials.**] *Mitt. schweiz. Landw.* 1954, **2,** No. 1, 1-8, bibl. 2, illus. [Eidgenöss. Landw. VersAnst., Zürich-Oerlikon]

On the basis of trials, fodder-beet varieties are classified into 3 groups according to whether their dry-matter content approximates to 9-13%, 13-16%, or 16-22%.—G.M.R.

## MANGEL

907 MANNER, R. Hammenhögs Kofor Barres. Ny foderbetsstam med högt odlingsvärde. [**Hammenhög's Kofor Barres mangel. New mangel variety with a high cultivation value.**] *Hammenhög's Ann. Cat.* 1954, Spring, 3-8, illus.

Hammenhög's Kofor Barres mangel was selected from Hammenhög's Original Barres strain, compared with which it has a fuller root and darker colour. In trials at Gullåker during 1944-52, the Barres mangel varieties Slättbo II, Hammenhög's Original, Halvlång, Svea and Kofor gave mean dry-matter yields of 84·3, 86·6, 81·6, 82·8 and 90 deciton (100 kg.) per ha., with dry-matter contents of 13·1, 12·9, 12·2, 12·2 and 13·4%, respectively. In trials at Ullevi, in Östergötland, during 3 years, Kofor and Halvlång gave 3·5 and 1·3% higher mean dry-matter yields than Slättbo II, respectively. In trials in Skåne during 1950-2, Kofor gave 2·6% higher dry-matter yields than Hammenhög's Original. The best yields of Kofor and Hammenhög's Original at Gullaker during 1949-52 were considerably higher than those of Slättbo II, Halvlång and Svea. The storage quality of Kofor was very good.—P.J.B.

## POTATO

908 CORNELL AGRICULTURAL EXPERIMENT STATION. **Potato production in New York State.** *Ext. Bull. 890. Cornell agric. Exp. Sta.* [n.d.], pp. 72, illus.

All practical aspects of potato cultivation in New York State are reviewed.—P.J.B.

909 WILSON, J. H. **Spray irrigation of potatoes.** *Tasm. J. Agric.* 1953, **24,** No. 4, 305-12, illus.

The results of two trials in which potatoes were grown under irrigation with different rates of fertilizer and different plant-spacings are reported. Yield results showed significant main effects of watering, fertilizer rate and spacings, and positive interactions of watering with high rates of fertilizer and of watering with close spacing. It is suggested that where soil fertility is high, spray irrigation would pay in practically all seasons.—From author's summary.

910 JANNACCONE, A. Ulteriori osservazioni sperimentali sulla coltivazione della patata precoce in Sicilia. [**Further experimental observations on growing early potatoes in Sicily.**] *Boll. Accad. Gioenia Catania* 1953, **2,** No. 5, pp. 14, bibl. 1. [Ist. Agron., Univ. Catania]

Results are given from preliminary trials carried out during 1951-3, using seed potatoes of the variety Sieglinde from Germany. Sprinkler-irrigated potatoes were found to mature earlier than those irrigated by furrows.—E.B.O.

911 MOLINA, M. Memoria-resumen de experiencias. 6. Experiencia sobre patata de primavera. [**Summary of irrigation experiments. 6. Experiments with early potatoes.**] *An. Inst. nac. Invest. agron.* 1953, **2,** No. 4, 379-96, illus. [Irrigation Sta., Cordova, Spain]

Irrigation water was supplied at various rates to crops of early potatoes in the 3 years 1950-2. The effect of the rate of irrigation on the yield of potatoes was significant in 1950 only, when the rainfall (amounting to 1221 cu. m. per ha.) was less than in the 2 succeeding years. The results of the experiment in 1950 indicated that 3500-4000 cu. m. of water per ha. (supplied by rainfall and irrigation) were required by the early potato crop; there was a significant decrease in the yield of potatoes when total supplies of water to the crop fell below 3500 cu. m. per ha.—W.J.B.

912 LUIJENDIJK, J. Potermaten en plantafstanden. [**The size of seed potatoes and potato plant populations in relation to yield and profitability.**] *LandbVoorl.* 1954, **11,** No. 3, 125-9. [Rijklandbouwconsulentschap, Rotterdam]

The following 4 experiments were carried out in various parts of the Netherlands to determine the effect of the size of seed potatoes and the plant population on the yield and profitability of potatoes grown for ware and for seed: (a) Potatoes of the 25-28, 28-35, 35-45 and 45-55 mm. grades, of the varieties Eigenheimer, Noordeling and Voran, were planted to give a plant population of 40 thousand per ha. and harvested as ware potatoes; (b) Various varieties of potatoes of the same grades as (a) were planted to give plant populations of 30, 40, 50 and 60 thousand and harvested as ware potatoes; (c) The yields of ware potatoes from cut setts (halves) of various varieties were compared with those from whole seed. Whole and cut seed of the 45-55 mm. grade were planted to give plant populations of 30, 40, 50 and 60 thousand ; (d) The yields of potatoes suitable for seed obtained from tubers (varieties Voran and Record) of the 25-28, 28-35, 35-45 and 45-55 mm. grades were compared, each grade being planted to give plant populations of 48, 56 and 67 thousand per ha. In experiment (a), the yields of saleable ware potatoes from the different grades were, in order of increasing size of seed potatoes, 33,500, 37,100, 39,400 and 41,000 kg. per ha. On the whole, with a plant population of 40,000, the 25-28 mm. grade of seed potatoes were unprofitable compared with the 3 larger grades. In experiment (b), the smallest grade of seed (25-28 mm.) was as profitable as any other grade when sown to give a plant population of 60 thousand per ha. [See *Fld Crop Abstr.* 6 : 1029 for an earlier account of this experiment.] The plant populations recommended for the 28-35, 35-45 and 45-55 mm. grades as a result of this experiment are 55, 45 and 35 thousand per ha., respectively. The cut setts used in experiment (c) were more profitable, when sown to give plant populations of 50 and 60 thousand per ha., than whole seed, even when the latter were sown to give the optimum plant population for the grade, 30-40 thousand per ha. In experiment (d), in which the profitability of crops of seed potatoes was calculated, the smallest grade 25-28 mm. gave unsatisfactory returns. The grades 35-45 mm. (planted to give a population of 55,000 per ha.) and 45-55 mm. (planted to give a population of 45,000 per ha.) are recommended for the purpose of growing seed potatoes.—W.J.B.

913 WERNER, H. O. **The effect of size of tubers and seed pieces in western Nebraska dryland potato culture.** *Amer. Potato J.* 1954, **31,** No. 1, 19-27, bibl. 3, illus. [Nebraska Agric. Exp. Sta.]

A 5-year trial was conducted to determine the effect of size of whole seed potatoes and the size of cut setts on stands and vigour of plants, and on yield and size of the tubers produced. The weight of the whole seed potatoes used in one year varied from 30 to 177 g., that of small cut setts from 16 to 31 g. and of large cut setts from 31 to 58 g. The number of setts cut from each tuber varied from 1 to 8. The following are the main results from this trial : (a) large cut setts produced the best stands, but there was a steady decrease in final stands of plants as the size of the seed potatoes increased ; (b) the number of stems per cut sett increased as the weight of the setts increased and also as the weight of the seed potatoes decreased ; (c) the average yields in the 5 years were increased by about 10 bu. per acre by doubling the size of the cut setts from 22 to 44 g., and, for a fixed size of seed pieces, the yields were increased by approximately 12 bu. per acre by decreasing the average size of the seed potatoes from 155 to 28 g. ; the lowest average yields occurred when tubers weighing 155 g. were cut into 8 pieces and the highest when tubers weighing 50 g. were planted whole ; (d) more large tubers were produced by small cut setts than by large setts ; the smaller seed potatoes produced more tubers of somewhat smaller size than did the large tubers.—E.B.O.

914 VINOGRADSKIĬ, B. M. [**Square-pocket method of planting potatoes.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 18-24.

It is claimed that this method (two tubers placed in pockets which are arranged on a chequer-board plan, the pockets being 70 × 70 cm. apart) is more satisfactory than the usual row planting because cultural measures are facilitated and yields are enhanced.—M.H.

915 ČMORA, N. Ja. [**Methods of increasing yield of potatoes in the non-chernozem belt.**] [Russian] *Priroda, Moskva* (*Nature, Moscow*) 1954, **43,** No. 2, 3-10, bibl. in text, illus.

This work includes a description of the machine SKG-4 used for planting potato tubers on the square-pocket system. The tubers are planted in pockets 70 × 70 cm. apart with two or three tubers per pocket. The machine has an appliance for distributing fertilizer with the tubers.—M.H.

916 DUBUFFET, G. Essais d'amélioration de la culture de la pomme de terre, par plantations retardées. [**Experiments in improving potato growing by late planting.**] *C. R. Acad. Agric. Fr.* 1954, **40,** No. 2, 84-8. [École Agric., Arras]

Tubers of the potato varieties Saskia, Bintje, B.F.15 and Saucisse, harvested in 1951, were late-planted in the open on 16 July, and harvested on 20 October, 1952, after the foliage had been destroyed by the frosts of 11 and 16 October. The tubers were stored during the winter in a cool cellar, and those which still gave no sign of germination were set to sprout in the light on 15 February, 1953. These tubers, referred to as the late tubers, were planted in the open on 1 April together with control tubers of the same varieties and origins grown in 1952 under normal conditions. The controls were further advanced in germination at the time of planting and they showed above ground earlier, but the subsequent growth of the late tubers was more rapid and vigorous, they were also more healthy and their yield was greater in every case, in one variety very considerably greater (Saucisse, 748%).—G.M.R.

917 BARBIER, R. Préculture et culture dérobée des pommes de terre. [**Pre-cultivation and catch-cropping of potatoes.**] *C. R. Acad. Agric. Fr.* 1954, **40,** No. 2, 79-84, bibl. 4.

An account is given of tests made with seed potatoes in different parts of France. Sample tubers were chemically treated with " Rindite " to interrupt dormancy and hasten germination and were then planted out, plants 20-30 cm. high being subsequently examined for virus attack. The efficiency of the chemical treatment varied according to potato variety, the origin of the tubers, their physical condition and degree of maturity, the concentration of the chemical and the duration of treatment. The method is considered worthy of further study and development for the use of breeders and producers of seed potatoes. Experiments in catch-crop cultivation were made by 5 farmers who lifted tubers at the end of June or in July and, after subjecting them to the chemical treatment described, planted them again immediately. The treatment was effective, in the doses indicated, for the varieties Bintje, Ideaal and Royal Kidney, and, in well-tilled, naturally humid or sufficiently watered soil, satisfactory yields were obtained whenever protection against mildew had been ensured.—G.M.R.

918 McDermott, N. **Potato varieties—old and new [in Gt Britain].** *J. roy. hort. Soc.* 1954, **79,** Pt. 3, 117-27.

919 Webb, R. E. and Miller, J. C. **Red La Soda —A mutation of La Soda.** *Amer. Potato J.* 1954, **31,** No. 2, 40-3, bibl. 1. [Louisiana Agric. Exp. Sta., Baton Rouge]

A description of the characteristics and adaptation is given of the new potato variety Red La Soda, which has plants and tubers identical with those of La Soda, except for more intensely coloured tubers. —E.B.O.

920 Peterson, C. E. and others. **Cherokee: a new medium-maturing potato variety resistant to common scab, late blight, mild mosaic, and net necrosis.** *Amer. Potato J.* 1954, **31,** No. 3, 53-8. [Iowa Agric. Exp. Sta., Ames]

921 Hoyman, W. G. and others. **Early Gem—a new russet skin potato.** *Bi-mon. Bull. N. Dak. agric. Exp. Sta.* 1954, **36,** No. 3, 88-92, illus.

Early Gem was selected from a Russet Burbank × X96-56 cross. Trials in North Dakota during 1950-3 showed that it was similar to Irish Cobbler in yield and maturity. Early Gem is very resistant to scab [*Actinomyces scabies*], tends to remain dormant during storage longer than other commonly grown varieties and is best adapted to sandy, or loamy soils in North Dakota.—P.J.B.

922 Johansen, R. H. and Schultz, J. H. **Potato variety trials in 1953.** *Bi-mon. Bull. N. Dak. agric. Exp. Sta.* 1954, **16,** No. 4, 132-6.

The results are given of 2 series of varietal trials in North Dakota. Among red-skinned varieties, Redburt, ND2200-IR, La Soda and Satapa gave the highest mean yields, with 418, 412, 410 and 403 bu. per ac. Redkote had the highest resistance to scab of any variety tested. A selection ND2569-4R was outstanding in respect of tuber type. In State-wide trials with 15 varieties and selections, average tuber yields were headed by Red Pontiac, ND2200-IR, ND92.49-2R, ND2470-3 and Cobbler, with 364, 357, 349, 345 and 329 bu. per ac., respectively. Early Gem, a new variety, was the most scab-resistant variety in these trials; but it is very subject to second-growth injury in the form of tuber cracks. Manota, a recently introduced variety, was similar to Cobbler in most respects, but relatively resistant to hollow heart. The promising ND series of selections are white-skinned strains, with good tuber type, quality and resistance to virus Y and scab.—P.J.B.

923 Eriksen, N. M. Sortsforsøg i kartofler. [**Varietal trials with potatoes.**] *Dansk Landbr.* 1954, **73,** No. 15, 200.

The results are presented of co-operative trials carried out in Denmark by the Potato Flour Manufacturers and Agricultural Co-operatives in Jutland during 1951-3, to compare the yields of 5 varieties of potatoes used for fodder or industrial processing. The trials were carried out on sand, clay and organic soils. Deodara was used as a standard variety. In 77 trials on all soil types, Dianella, Robusta, Alpha and Richters Imp., J. J. gave respective yields 18, 12, 12 and 8% higher than those of Deodara. Dianella gave the highest yields on all soils. Robusta gave lower tuber yields than Dianella in most cases, but had a very high dry-matter content (25·5%). Alpha gave relatively high yields on damp soils. Dianella was relatively better suited to dry soils than Robusta or Alpha.—P.J.B.

924 Pomme de Terre Française. Les variétés admises au contrôle. 1954. [**The (potato) varieties certified in 1954 (in France).**] *Pomme de terre fr.* 1954, **17,** No. 176, 2-24.

Information is given on the origin, plant and tuber characters, earliness, disease resistance, cultural requirements, yield and use of 40 certified potato varieties and of 4 varieties under study.—E.B.O.

925 Keller, E. R. Massnahmen zur Erzielung von gesundem Kartoffelsaatgut. [**Measures to obtain healthy seed potatoes.**] *Mitt. schweiz. Landw.* 1954, **2,** No. 3, illus. [Eidg. Landw. Versuchsanst., Zürich-Oerlikon]

Compared with other countries, Switzerland experiences exceptional difficulties in producing healthy seed potatoes. In this advisory article, six precautionary measures are noted: sowing of class A seed only; using sprouted potatoes; avoidance of heavy applications of manure, particularly nitrogenous manure, because these produce a luxuriant growth of herbage which assists the spread of disease and masks the presence of diseased plants; isolation of the multiplication fields by separating them with strips of other crops to hinder the migration of wingless insects; early and complete removal of infected plants; using the crop from plants adjacent to the field boundary for purposes other than seed.—D.B.

926 SIMON, W. Verbesserte Pflanzgutvorbereitung durch Wässern der Kartoffeln. (Untersuchungen über Keimhemmungs- und Keimförderungsmassnahmen.) [**Improved preparation of potato seed tuber by watering. (Studies of measures for inhibiting and promoting germination.)**] *Z. Acker- u. Pflbau* 1954, **97**, No. 3, 369-88, bibl. 30, illus. [Inst. Acker- u. Pflbau, Univ. Rostock, Germany]

In the author's trials it was found that the 2 synthetic preparations "Agermin" and "Bikartol" can retard potato germination in the spring for 6 weeks or longer, and that reaction to these preparations is varietal, early and medium-early potatoes suffering a certain amount of injury which results in reduced yield while late varieties are little or not at all injured, in some cases even giving increased yields. Measures for promoting germination are pre-sprouting, vernalization, and the author's own technique of watering, which is designed for the use of farmers. In the process, the seed tubers are submerged for 5-8 min. in water, after which they are immediately shaken vigorously for another 2-3 min. either under or out of the water. It is claimed that potatoes taken straight from the clamp and treated in this manner produced an increase in yield of 3·6%; in conjunction with subsequent 14 days' vernalization the increase in yield (3-year average of 12 trials) was 7·1% when compared with vernalized but unwatered seed potatoes. The variety Ackersegen has proved especially responsive to watering, and is recommended for experimental purposes.—G.M.R.

927 ALDRICH, R. J. and others. **Cultivation and chemical weed control in potatoes.** *N. J. Agric.* 1954, **36**, No. 1, 8-11, illus.

Practical recommendations, based on experiences in New Jersey, are made for controlling weeds in potato crops. For annual weeds, applications of 3-4·5 lb. active DNOSBP per ac., made just before the emergence of the potato plants, are satisfactory. Following such treatment, cultivations are not required for 4-5 weeks and subsequent cultivations can be limited to not more than two, compared with the 4-8 cultivations thought necessary where no herbicide is applied. Data of the tuber yield of potatoes, following 1-6 cultivations for controlling weeds during 3 seasons, showed that cultivating more than 3 times during two out of three seasons reduced yields, this being considered a direct result of soil compaction and damage to potato root systems.—P.J.B.

928 CUNNINGHAM, C. E. and TREVETT, M. F. **Chemical weed control in potatoes.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 177-82, bibl. 1. [Maine Agric. Exp. Sta., Orono]

Trials in Maine were carried out to compare DNOSBP with other herbicides for control of annual broad-leaved weeds in potatoes. Treatments applied during emergence were: Crag Herbicide (90% Na 2,4-dichlorophenoxyethyl sulphate) at 2 and 4 lb. per ac., Natrin (Na 2,4,5-trichlorophenoxyethyl sulphate) at 2 and 4 lb. per ac., CIPC at 4 lb. per ac., CMU at 0·5 and 1 lb. per ac., Premerge (53% alkanolamine salts of DNOSBP) at 1·5 lb. active ingredient per ac. and DNOSBP at 3 lb. acid equivalent per ac. DNOSBP was the only herbicide that gave satisfactory broad-leaved (mainly *Brassica* spp.) weed control. The ineffectiveness of the other materials may have been due to drought incidence after treatment. Potato tuber yields and specific gravity were not significantly affected by any treatment. In post-emergence treatments, Dalapon (64-68% Na salt of a,a-dichloropropionic acid) was included. DNOSBP gave effective control of weeds as a post-emergence treatment. Dalapon was tolerated by potatoes when applied as an overall spray at 2 lb. acid equivalent per ac., or 4 lb. per ac. as a directed spray between the rows. Overall treatments with 4 lb. Dalapon per ac. reduced tuber yields. Applications of 2 lb. Dalapon per ac. effectively controlled Japanese millet [*Echinochloa crus-galli*], used as a test weed crop, both as a pre-emergence and post-emergence treatment.—P.J.B.

929 OORT, A. J. P. Het eerste optreden van *Phytophthora* in het voorjaar. [**The first appearance, in spring, of *Phytophthora infestans* on potatoes.**] *LandbVoorl.* 1954, **11**, No. 3, 116-20, illus. [Lab. Phytopath., Wageningen, Neths]

In 1952-3 observations were made in the early-potato districts of the Province North-Holland (the district in the Netherlands where late blight, *P. infestans*, makes its first appearance each year) with a view to locating the foci of the disease. Although the disease was first located (on 13 May and 28 April in 1952 and 1953, respectively,) in plants growing on rubbish heaps, the position of the rubbish heaps did not appear to influence the location of disease-foci in the potato fields, where *P. infestans* first appeared on 17 May, 1952 and 26 May, 1953. The foci, when first discovered, measured 5-10 m. in diameter. The first symptom of the disease was the appearance of long brown stripes on the stems of the young plants. The tubers from which such diseased stems grew were, in general, free of disease. When the individual plants within a disease-focus were examined separately, one plant was found in each focus with a few withered stems growing from a seed-tuber infected with *P. infestans*. It is concluded that, in the district studied, diseased tubers (giving rise to secondary infection in the stems from which the disease is conveyed to surrounding plants) are chiefly responsible for the first onset of *P. infestans*.—W.J.B.

930 NIEDERHAUSER, J. S. and MILLS, W. R. **Resistance of *Solanum* species to *Phytophthora infestans* in Mexico.** *Phytopathology* 1953, **43,** No. 8, 456-7, bibl. 2. [Rockefeller Found., Mexico, D.F.]

Notes are given on the incidence of *Phytophthora infestans* on *Solanum demissum*, *S. cardiophyllum*, *S. bulbocastanum*, *S. stoloniferum*, *S. pinnatisectum*, *S. jamesii*, *S. sambucinum* and *S. iopetalum* growing wild in the Toluca Valley, at about 8400 ft. a.s.l., in an environment considered close to the ideal for the development of blight. Except for *S. bulbocastanum*, all species were susceptible to *P. infestans*; certain clones of *S. demissum* and *S. cardiophyllum* were highly resistant.—P.J.B.

931 EMILSSON, B. and GUSTAFSSON, N. **Studies on the control of common scab on the potato.** *Acta agric. scand.* 1954, **4,** No. 1, 33-62, bibl. 57. [Pl. Res. Inst., Nynäshamn, Sweden]

The results are given of experiments carried out during 1946-52 on the control of scab (*Actinomyces scabies*) of potatoes. The methods studied included: (a) the treatment of seed tubers by different fungicidal materials, (b) soil disinfection with PCPA and sodium fluoride, (c) altering the soil pH by heavy, single applications of ammonium sulphate, or superphosphate, and (d) biological control by the use of green manures and crop rotation. The only treatment showing promise in practice under Swedish conditions was the use of 800 kg. ammonium sulphate per ha., which resulted in a significant reduction in scab incidence in some cases.—P.J.B.

932 LUDBROOK, W. V. and BROCKWELL, J. **The comparative resistance of some potato varieties to common scab.** *J. Aust. Inst. agric. Sci.* 1953, **19,** No. 4, 262-4, bibl. 5. [Div. Pl. Industr., CSIRO, Canberra]

933 BONETTI, E. M. Prove comparative di lotta contro *Leptinotarsa decemlineata.* [**Comparative trials for the control of *Leptinotarsa decemlineata* (Colorado beetle).**] *Ann. Fac. Agr., Milano* 1953, **2,** 59-74, illus.

Plot trials, in which several insecticides were tested for the control of the Colorado beetle on the potato variety Tonda di Berlino, indicated that calcium cyanamide, although less effective than Parathion, Pestox 66 OMPA, Lintox and Vibordor had good insecticidal action. The best results were obtained by using pure calcium cyanamide as a dust, at the rate of 15 kg. per ha.—E.B.O.

934 MINZ, G. and GORODEISKY, N. **Root-knot nematodes in outwardly clean seed potatoes.** *Hassadeh* 1953, **34,** No. 3, 166.

Outwardly clean seed potatoes of Up-to-Date and Arran Banner varieties were collected from mid-June until the beginning of July, 1953, from 5 localities infested with the root-knot nematode, *Meloidogyne* sp. The first examination of tubers for nematodes was made shortly after harvest, the second examination after 64-93 days storage at room temperature. Tubers were cut longitudinally once, and sometimes twice, and nematodes removed by a spear needle and examined with a binocular microscope (90×). The parasite was found under the skin up to 7-8 mm. from the periphery. Although a relatively higher amount of nematodes was found in the second examination, the data available from these tests are insufficient to indicate the rate of development and reproduction of nematodes in the tubers during storage. Tubers from infested soil, even when outwardly clean from nematodes, may internally harbour viable nematodes in all stages of development, in huge numbers.—Authors' summary.

935 NORRIS, D. O. **The effect of virus X on yield of potatoes. An assessment.** *J. Aust. Inst. agric. Sci.* 1953, **19,** No. 4, 251-6, bibl. 19. [Div. Pl. Industr., CSIRO, Canberra]

The findings of workers from all parts of the world on the reduction of potato yield by infection with virus X are tabulated. The table shows great variability in the loss estimated, ranging from 74% in one case (Klinkowski, 1951, Germany) to *nil* in another (Clinch and McKay, 1949, Ireland). Although there is no question that the presence of virus X in potato varieties considerably lowers the yield potential, built-up stocks of virus X-free (FX) material in Australia have not always given better yields than X-infected stocks. Some possible reasons for this are examined. The wisdom of wholesale replacement of existing certified stocks with the available FX material having been questioned, it is suggested that if the starting material were selected from the most desirable X-infected stocks and were freed from X by some means such as chemotherapy, an answer to the problem might be found and the re-establishment of some form of FX potato scheme, such as that begun in Australia in 1944 but since abandoned, might be economically worth while. A technique for chemotherapeutic treatment of this nature has now been evolved—G.M.R.

936 DIERCKS, R. Der Einfluss der Mineralsalzernährung auf Wanderungs- und Ausbreitungs-Geschwindigkeit des X-Virus in der Kartoffelpflanze. [**The rate of migration and spread of virus X in the potato plant as affected by nutrition with mineral salts.**] *Z. Pflbau* 1953, **4,** (**48**), No. 6, 252-88, bibl. 47, illus. [Inst. Acker- u. Pflbau, München-Weihenstephen, Germany]

937 VÖLK, J. and BODE, O. Weitere Untersuchungen zur Frage eines Zusammenhanges zwischen Düngung, Blattlausbesatz und Krankheitsausbreitung in Kartoffelbeständen. [**Further investigations on the connexion between manuring, number of leaf lice and the spread of disease in potato crops.**] *Z. PflKrankh.* 1954, **61,** No. 2, 49-70, bibl., illus. [Inst. Virusforsch., Celle, W. Germany]

[In this paper the word lice includes the following: *Myzus persicae* Sulz., *Doralis rhamni* Koch, *Doralis frangulae* Koch, *Aulacorthum pseudosolani* Theob., and *Macrosiphon solanifolii* Ashm.] The cause of the high percentage of potato plants infected with leafroll virus when the crop was fertilized with commercial potassium chloride was investigated. Different fertilizer treatments (KCl, NaCl, $K_2SO_4$, $(NH_4)_2SO_4$ and no fertilizer) were applied to small plots of potato plants, the concentration of fertilizer added being that normally applied in practice. For each treatment, counts were made of insect vectors per 100 leaves and of the number of infected plants. Under the four treatments there was no marked difference in the number of insects, but in plots under KCl and NaCl there was a significantly higher percentage of infected plants. It was concluded that the increase in the number of infected plants was due to a greater susceptibility to the virus and that this susceptibility was induced by KCl and NaCl. Results obtained on substituting $K_2SO_4$ for KCl confirmed the view that the chlorine ion was responsible for the increased susceptibility.—D.B.

938 WITSCH, H. v. and POMMER, J. Tagesgänge der Assimilation gesunder und blattrollkranker Kartoffelpflanzen. [**Daily course of assimilation in healthy and leafroll-diseased potato plants.**] *Biol. Zbl.* 1954, **73,** No. 1/2, 1-11, bibl. 12. [Techn. Hochsch., Munich]

939 STAPP, C. Die Serologie in ihrer Bedeutung für die Erforschung pflanzlicher Virosen und deren Bekämpfung. [**The significance of serology for the study of plant viruses and their control.**] *Sonderh. Landw. Forsch.* 1953, **4,** 170-80, bibl. 60. [Brunswick]

The subject is discussed on the basis of the literature and with special reference to virus diseases of potato and beet.—G.M.R.

940 HIRATA, S. **Studies on the diagnosing method for virus infected potato and radish by some protein reactions.** *Japan. J. Bot.* **14,** No. 1, 53-66, bibl. 2, illus.

Phenol and $HgCl_2$-fuchsin were successfully used as reagents for the diagnosis of potato virus diseases.—W.J.B.

941 JAEHNL, G. Das Kartoffelblatt. [**The potato leaf.**] *Veröff. Bundesanst. alp. Landw. Admont* 1954, No. 9, 15-39, illus.

Photographs of one young and one old leaf of 24 potato varieties, together with a short description, are presented as a means of identification. Five of the 24 varieties have leaves clearly differing from any of the others, but the remainder fall into 4 groups, in each of which the varieties have a similar type of leaf.—G.M.R.

942 MININA, A. K. [**Variability in the content of organic acids in leaves and tubers of *Solanum tuberosum*.**] [Russian] *Biohimija* (*Biochemistry*) 1953, **18,** No. 6, 718-24, bibl, 24, illus. [Bach Biochem. Inst., Moscow]

The literature on this subject is limited. A knowledge of the laws of variability in the content of organic acids in plants is requisite in order to understand the role of such acids in the plant's physiological processes. The following conclusions are based on results obtained under conditions of the author's tests. In leaves of the potato plant, the content of malic acid usually is greater than that of citric acid, while the reverse is the case in the tubers. The older the leaf, the greater the content of both acids. Both acids increase in quantity in the plants at the time of mass flowering and decrease at the end of the vegetative period. The content of citric acid in the leaves increases during the night and decreases during daylight, while the content of malic acid remains constant throughout the whole 24 hours. When leaves and tubers of the potato plant are grown with a supply of nitrogen in the form of nitrate, both organic acids occur in an amount 1·5 to 4·5 times greater than when the plants are grown with ammoniacal nitrogen.—M.H.

943 JAEHNL, G. Zur Kenntnis des Blühverhaltens der Kartoffel. [**Flowering in the potato.**] *Veröff. Bundesanst. alp. Landw. Admont* 1954, No. 9, 40-74, bibl. 4.

Throughout 4 years' potato variety trials, in which 20-30 varieties were tested each year, counts of the flowers formed were made every 2 or 3 days after the beginning of flowering until the last flowers had withered or dropped. Selected curves showing the duration and intensity of flowering of different varieties in different years are presented and discussed as they are affected by variety, weather conditions, and date of planting.—G.M.R.

944 Roberts, Edith A. and Proctor, B. E. **The appearance of starch grains of potato tubers of plants grown under constant light and temperature conditions.** *Science* 1954, **119,** No. 3094, 509-10, bibl, illus. [Fd Technol. Dep., Mass. Inst. Technol., Cambridge]
The lamellations of potato starch grains from the tubers of plants grown under uniform conditions of light intensity and air temperature were indistinguishable from those of the starch grains of plants grown in the field in Maine.—P.J.B.

945 Bradbury, Dorothy and Ennis, W. B. **Histological abnormalities of tubers formed on Irish potato plants sprayed with butyl 2,4,5-trichlorophenoxyacetate.** *Amer. J. Bot.* 1953, **40,** No. 10, 827-34, bibl. 6, illus. [Chem. Corps, U.S. Army, Washington, 25 D.C.]

946 Volk, G. M. and Gammon, N. **Potato production in Florida as influenced by soil acidity and nitrogen sources.** *Amer. Potato J.* 1954, **31,** No. 3, 83-92, bibl. 8, illus. [Florida Agric. Exp. Sta., Gainesville]

947 National Institute of Agricultural Engineering. **An approximate determination of the moisture content/relative humidity equilibrium relationship for potatoes in air.** *Tech. Mem. 72/GD/52 N.I.A.E.* 1953, pp. 6, illus.
By the use of suitable apparatus described, an approximate moisture content/relative humidity equilibrium curve was established for a sample of potatoes. In a ventilated indoor store, potatoes are in equilibrium with air of 100% R.H. at a moisture content of about 60%.—C.L.S.

948 Wilson, A. R. and Harries, J. M. **Flavour of potatoes treated with tetrachloronitrobenzene and *iso* propyl *N*- phenylcarbamate.** *J. Sci. Fd Agric.* 1954, **5,** No. 2, 90-5, bibl. 6.
Tests carried out by two independent taste-panels showed that autumn treatment of potatoes with 3% TCNB dust (applied at a rate of 10 lb. per ton of tubers) to reduce sprouting during storage resulted in a slight but significant lowering in the quality of the flavour ; the decline in flavour quality was less marked after 8 than after 5 months' storage. A consumer-acceptance test of potatoes treated with TCNB and stored for 8 months failed to reveal any off-flavour in the potatoes when served as part of a meal. IPC dust, 24%, applied at a rate of 2·5 lb. per ton of tubers had no deleterious effect on the quality of stored potatoes.—W.J.B.

949 Witz, R. L. **Measuring resistance of potatoes to bruising.** *Agric. Engng, St. Joseph, Mich.* 1954, **35,** No. 4, 241-4, bibl. 7, illus. [N. Dakota Agric. Coll.]
Descriptions are given of instruments for testing the resistance of potato tubers to pressure, abrasion and impact. Data, taken from State trials in North Dakota, are given of the resistance of a number of potato varieties and strains to impact, abrasion and pressure at 4 different locations. Interactions between variety and location in respect of the above data were highly significant.—P.J.B.

## SWEET POTATO

950 Cordner, H. B. and others. **Redgold sweet potato. A new high-yielding, wilt-tolerant variety.** *Bull. No. B-411. Okla. agric. Exp. Sta.* 1953, pp. 7, illus.
In yield trials over 4 years in Oklahoma, Redgold has, in most cases, outyielded Allgold and Unit No. 1 Porto Rico. Redgold had an average moisture content of 77.3%, with 74.9 mg. ascorbic acid per 100 g. dry weight and 29·8 mg. carotene per 100 g. dry weight. In ascorbic acid and carotene content it is inferior to Allgold, but superior to Unit No. 1 Porto Rico.—P.J.B.

951 Murthy, H. B. N. and Swaminathan, M. **The nutritive value of different varieties of sweet potato.** *Curr. Sci.* 1954, **23,** No. 1, 14, bibl. 6. [Cent. Fd Tech. Res. Inst., Mysore]
The chemical composition of white-fleshed sweet potatoes (*Ipomoea batatas*) cultivated in India, and of orange-fleshed American varieties was determined. The carotene content of the orange-fleshed varieties varied from 5·4 to 7·2 mg. per 100 kg. ; the white-fleshed varieties contained no carotene.—W.J.B.

952 Paterson, D. R. and others. **Maleic hydrazide as a sprout inhibitor for sweetpotatoes.** *Science* 1954, **119,** No. 3094, 507-8, bibl. 9. [Texas A. and M. Coll., College Station]
The results are given of observations on sprout production by sweet potato tubers in storage following the insertion into the tubers of toothpicks impregnated with concentrations of 1000-16,000 ppm. of maleic hydrazide. Concentrations ranging from 1000-4000 ppm. resulted in a considerable increase in numbers of sprouts over 1 in. long, but not of those over 6 in. long, apparently the result of reduction in proximal dominance of the tuber,

caused by the maleic hydrazide. Sprout inhibition and reduced proximal dominance were also obtained following the use of pre-harvest maleic hydrazide sprays.—P.J.B.

## GENERAL

953 Van Den Abeele, M. and Vandenput, R. Plantes amylacées. [**Starchy crops.**] [Reprint from] *Princ. Cult. Congo belge* 1951, pp. 84, bibl. 36, illus., Bruxelles; Minist. Colon., Dir. Agric. [Received 1954]

Information is given on the following crops grown in the Belgian Congo: cassava (*Manihot esculenta* and *M. utilissima*), sweet potato (*Ipomoea batatas*), potato, cocoyam (*Colocasia antiquorum*), yam (*Dioscorea alata*), maize, rice (*Oryza sativa* var. *utilissima*), sorghum (*Sorghum vulgare*), millet (*Pennisetum typhoideum*), wheat, finger millet (*Eleusine coracana*) and Job's tears (*Coix lachryma-jobi*). Wheat, a new crop in the Belgian Congo, is grown in the Kivu and Ruanda-Urandi at altitudes of about 2000 m.a.s.l., where it is essential to employ rust-resistant varieties. The cultivation of Job's tears is still in the experimental stage.—E.B.O.

# FIBRE CROPS

## COTTON

954 Van Den Abeele, M. and Vandenput, R. Plantes textiles. [**Fibre crops.**] [Reprint from] *Princ. Cult. Congo belge* 1951, pp. 46, bibl. 40, illus., Bruxelles; Minist. Colon., Dir. Agric. [Received 1954]

Information is given on cotton, *Urena lobata* and jute in the Belgian Congo.—E.B.O.

955 Roux, J. B. Quelques données d'expérimentation cotonnière dans le Sud-Tchadien. [**Some data from cotton trials in the south of Chad.**] *Cot. et Fibr. trop.* 1953, **8,** No. 2, 231-9, illus.

The following are the principal conclusions from the trials described: (a) cotton should be sown from 20 June to 5 July, never after 15 July; (b) the best spacing on poor soil seems to be 60 × 20 cm., while on rich soil it should not be closer than 80 × 30 cm.; (c) hoeing before sowing, and 3 weedings (end July, end August and end September or early October) compared with 2, increase cotton yields. Results are also given from trials of mechanized cultivation and manuring of cotton.—E.B.O.

956 Rossin, M. Quelques aspects de la culture cotonnière aux États-Unis. [**Some aspects of cotton cultivation in the USA.**] *Agron. trop.* 1954, **9,** No. 1, 59-80, bibl. 1, illus.

957 Nagibin, Ja. and Arabov, B. [**Double-line sowing of cotton.**] [Russian] *Hlopkovodstvo* (*Cott. Prod.*) 1953, **3,** No. 9, 36-7. [Received 1954] [Uzbek Agric. Inst.]

An experiment was started at a collective farm in the Past-Dargomask area, Samarkand Region, to study the effect of double-line sowing on yield of seed cotton. The sowings were spaced as follows: 20 cm. between double lines with 50 cm. between centres; 1 plant per pocket. A single-line sowing (control) comprised 1 plant per pocket with 70 cm. between centres. Under the cultural treatments described, yields from the double-line sowings were greater (by 9 to 14%) than those from the single line sowings.—M.H.

958 Dufresse, M. Essais culturaux sur le cotonnier (années antérieures à 1951). [**Cultural trials with cotton** (**in Morocco**) **in the years before 1951.**] *Cahiers Rech. agron.* 4. *Dir. Agric., Commerce, For., Morocco* 1951, 99-129, bibl. 8. [Received May, 1954]

959 Iltis, J. Travaux effectués en 1951 sur le cotonnier. [**Work with cotton in 1951** (**in Morocco**).] *Cahiers Rech. agron. 4. Dir. Agric., Commerce, For., Morocco* 1951, 203-21. [Received May, 1954]

Selection work continued to improve the productivity and earliness of the cotton variety Pima 67. The bollworm (*Earias insulana*) practically destroyed all the American varieties (*Gossypium hirsutum*) under trial. The Egyptian varieties (*G. barbadense*) were resistant to this pest. The Egyptian varieties L.3L., Menoufi, 1515 and Giza 7 yielded more, and Menoufi and Giza 7 were earlier, than the control Pima 67. While the fibre length of Pima 67 exceeds 39 mm., that of the other above-named varieties does not reach 35 mm. Other high-yielding varieties of the Egyptian type were Tanguis, Malaki and X1730 A.—E.B.O.

960 Pardo, M. Resultados de un ensayo comparativo de variedades precoces de algodón en Zaragoza. [**Results of comparative trials of early-maturing varieties of cotton at Saragossa.**] *Bol. Inst. Invest. agron.* 1953, **13,** No. 29, 323-73, illus., English summaries pp. 357, 367 and 373. [Inst. Invest. Agron. Granja Agric. de Zaragoza, Spain]

Preliminary trials were carried out to compare, in the conditions of the Ebro Valley, two cotton varieties grown there, Chirpan and Security, with the following varieties imported from the USA: Arcot, Paymaster, Knoxville, Empire W. R., Empire and Hi-breed. In the first trial, Paymaster, Hi-breed, Chirpan and Security sown on 17 May, were compared. Details are given of the irrigation applied, the rainfall during the growing season and the manurial status of the soil. The percentages of the total harvest of seed-cotton harvested by 27 November were 94, 94, 92 and 76% for Paymaster, Hi-breed, Chirpan and Security, respectively. It is not therefore considered advisable to sow Security in the Ebro region in view of the poor weather which commonly occurs there in December. There were no consistent differences between the total yields of seed-cotton from Hi-breed, Paymaster and Chirpan. Hi-breed and Paymaster gave higher ginning percentages (34-39% and 37%, respectively) than Chirpan (30%). There were no important differences in fibre-length between Hi-breed, Paymaster and Chirpan. In the second trial, sown on 26 May, in which all the varieties mentioned were tested, Chirpan and Security were both outyielded by all other varieties.—W.J.B.

961 KULEBJAEV, V. [**Selection of thin-fibred cotton in Turkmenia.**] [Russian] *Hlopkovodstvo* (*Cott. Prod.*) 1953, **3**, No. 9, 38-42, illus. [Received 1954]
[See also *Pl. Breed. Abstr.* 24 : 459.]

962 LAGIÈRE, R. Conservation et traitement des semences du cotonnier. 1. Synthèse bibliographique. [**Storage and treatment of cotton seed. 1. Bibliographical synthesis.**] *Cot. et Fibr. trop.* 1953, **8**, No. 2, 201-30, bibl. 50, illus.

This is a review of published work on the subject. A brief summary is given of trials carried out at the Bambari Station, Ubangi Shari, during 5 years, in which French fungicides were tested. Results from these trials will be published in 1954.—E.B.O.

963 SWANSON, C. R. and others. **Some effects of isopropyl N-(3-chlorophenyl) carbamate and an alkanolamine salt of dinitro ortho secondary butyl phenol on germinating cotton seeds.** *Weeds* 1953, **2**, No. 3, 178-89, bibl. 13, illus. [Weed Invest. Div., Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

Studies are reported on the effect of CIPC and DNOSBP on the germination, root elongation and root-tip respiration of cotton seed. The CIPC was in the form of a concentrate in xylene, emulsifiable in water, while the DNOSBP was in the form of an alkanolamine salt formulation containing 3 lb. DNOSBP per gal. The cotton seed was exposed to direct contact and to the vapour of the herbicides. In the direct contact treatments a 50% depression of root elongation occurred where rates equivalent to 0·125 lb. DNOSBP per ac. were applied ; it was considered that where rates as low as 0·03125 lb. per ac. were applied, marked reduction in germination and reduced growth vigour could be expected in the field. With CIPC, rates equivalent to 16 lb. per ac. had no effect on germination. All rates of CIPC (1·6, 8 and 16 lb. per ac.) caused marked inhibition of root elongation. It was thought that CIPC affected the process of cell elongation. Vapours of DNOSBP inhibited both the germination and root elongation of cotton seed, though this effect was much less marked than in the case of direct-contact treatments. CIPC vapour had much the same effect as the direct-contact treatments. Root elongation was retarded to a relatively constant extent, irrespective of the rate of CIPC treatment ; root elongation inhibition by direct contact with CIPC and DNOSBP was approximately equal where amounts above 1 lb. per ac. were applied. Contact applications of 0·3125 lb. DNOSBP per ac. slightly increased root-tip respiration ; 1·6 lb. CIPC per ac. markedly reduced respiration. The effect of DNOSBP on respiration was much more rapid than in the case of CIPC.—P.J.B.

964 HOFFPAUIR, C. L. and PONS, W. A. **Review of the properties of gossypol and methods of its estimation.** *J. Ass. off. agric. Chem. Wash.* 1953, **36**, No. 4, 1108-18, bibl. 47. [Reg. Res. Lab., Bur. Agric. Industr. Chem., U.S. Dep. Agric., New Orleans 19, La]

965 WILES, A. B. **Reaction of cotton varieties to Verticillium wilt.** [Abstract] *Phytopathology* 1953, **43**, No. 9, 489.

966 MAKAROVA, V. [**Microbiological damage to the cotton fibre at the period of ripening.**] [Russian] *Hlopkovodstvo* (*Cott. Prod.*) 1953, **3**, No. 9, 43-5, illus. [Received 1954]

A bacteriological analysis has been made of the fibre from ripe and unripe cotton bolls grown in Uzbekistan and Armenia. There is evidence that, under certain conditions of moisture and temperature, the fibre in the closed boll may be attacked by micro-organisms. For example, if the boll has an average moisture content (75-80%) and temperature is 20-25° C. during 5 or 7 days, then various degrees of injury may be found in the fibre.—M.H.

967 EATON, F. M. and ERGLE, D. R. **Effects of shade and partial defoliation on carbohydrate levels and the growth, fruiting and fiber properties of cotton plants.** *Pl. Physiol.* 1954, **29**, No. 1, 39-49, bibl. 15. [Div. Cott. and Other Fiber Pl. and Diseases, U.S. Dep. Agric.]

Cotton plants were grown under three levels of irrigation (heavy, medium, light). At the beginning of flowering some were subjected to a reduced light intensity, others to partial defoliation. Light intensity was reduced to 32% of normal by covering the plants with muslin. For partial defoliation half of the leaf surface of each mature leaf was severed and subsequently, at weekly intervals, half of each new leaf was cut off as it attained a length of about 6-8 cm. The reduction of the light intensity reduced the total of sugar and starch (1) in the leaves by 24%, (2) in the main stem by 38% and (3) in 14-day-old bolls by 8% (means of results under heavy, light and medium irrigation) ; it reduced (1) the yield of seed cotton (under heavy irrigation) by 47%, (2) fresh weight of leaves plus stems by 13% and (3) relative fruitfulness (bolls per 100 g. of fresh stems and leaves) from 6·0 to 3·3 ; plant height increased but the number of nodes decreased ; fibre strength and weight per inch decreased while fibre length increased. The leaf treatment caused (1) little change in the total of sugar and starch in the leaves or young bolls but (2) a reduction of 42% of carbohydrates in the main stem ; it reduced (1) plant height by 28%, (2) the number of main-stalk nodes by 5%, (3) fresh weight of leaves plus stems by 30% and (4) yield of seed cotton by 14% ; there was an increase in fibre strength (significant) and relative fruitfulness (not significant). The effects of the two treatments on fruitfulness are discussed in terms of ratios of vegetative weights to number of bolls and of auxin and anti-auxin relations ; the effects on fibre strength are considered in terms of carbohydrate relations.—D.B.

968 SAUER, H. F. G. Anormalidades observades em algodoeiros tratados com doses excessivas de inseticidas. [**Abnormalities observed in cotton plants treated with excessive quantities of insecticides.**] *Biologico* 1953, **19,** No. 12, 213-17, illus.

969 ČUMANOV, Ja. [**Application of organo-mineral fertilizers in cotton fields.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 2, 55-8.

970 ILTIS, J. Les recherches cotonnières au Maroc de 1947 à 1950. [**Cotton research in Morocco during 1947-50.**] *Cahiers Rech. agron. 4. Dir. Agric., Commerce For., Morocco* 1951, 131-202, bibl. 12, illus. [Received May, 1954]

## FLAX

971 GRILLOT, G. Étude et amélioration des lins textiles. [**The study and improvement of fibre flax (in Morocco).**] *Cahiers Rech. agron. 4. Dir. Agric., Commerce, For., Morocco* 1951, 25-75, bibl. 55, illus. [Received May, 1954]

A description of the flax plant (*Linum usitatissimum*) and its geographical distribution are given. While oil flax is an established crop in Morocco, the growing of fibre flax is not practised. An account is given of cultural trials with fibre flax in Morocco, begun in 1915, and of various attempts at introducing it into cultivation. Results from trials showed that fibre flax, sown at a high seed-rate at the end of autumn/beginning of winter, can be grown successfully without irrigation during winter. The improvement work on this crop consists in introducing new varieties and hybridization. The following fibre varieties are suitable for Morocco : Pskow de Verrières, Hollande (white flowers), Hollande C22, Concurrent, the selections No. 580 and No. 543 of the Centre de Recherches Agronomiques of Rabat, and Maroc 0·1 (a double-purpose variety, for fibre and oil). Provided that seed purity is maintained, the quality of these varieties does not deteriorate under cultivation for several years. The double-purpose varieties, obtained by crossing introduced fibre varieties and local oil varieties, are not completely satisfactory. It is thought that the cultivation of fibre flax could be developed in regions near the Morroccan sea coasts. —E.B.O.

## HEMP

972 MAGNE, C. Le chanvre et son amélioration. [**Hemp** (*Cannabis sativa*) **and its improvement.**] *Cahiers Rech. agron. 4. Dir. Agric., Commerce, For., Morocco* 1951, 227-302, bibl. 58, illus. [Received May, 1954]

This work on hemp, based on bibliographical, laboratory and field studies, is concerned with the following aspects, amongst others : economic importance of hemp in the world and in Morocco ; botanical description ; systematics ; origin of cultivated hemp ; vegetative cycle ; pollination ; sex ; varieties ; improvement ; work with hemp carried out at the Centre de Recherches Agronomiques, Rabat.—E.B.O.

973 ILTIS, J. 2. Essais sur le chanvre. Compte rendu des resultats obtenus à Rabat en 1948. 4. Travaux effectués en 1951 sur le chanvre. [**2. Hemp** (*Cannabis sativa*) **trials. Account of results obtained at Rabat in 1948. 4. Work with hemp in 1951.**] *Cahiers Rech. agron. 4. Dir. Agric., Commerce, For., Morocco* 1951, 303-14 and 323-7, illus. [Received May, 1954]

The results from sowing-date trials with hemp in 1948 and 1951 showed that sowing at the beginning of March (4 and 7 March, respectively) gave the highest stem yields. The results from varietal trials in 1951 confirmed those obtained in previous years. Of 19 varieties grown in 10 sq. m. plots, the variety Sefrou (Morocco) gave the highest stem yield, 11·2 kg., followed by Fatza and Turquie (from Turkey).—E.B.O.

974 LONA, F. Prefioritura e nanismo della

canapa nel quadro del foto-termoperiodismo. [**Early flowering and dwarfing of hemp in relation to the photo-thermoperiodism.**] *Humus* 1953, **9,** No. 12, 12-16, illus. [Ist. Bot. Univ. Parma, Italy]

Fibre hemp [*Cannabis sativa*] in Italy sometimes flowers too early, i.e., in May instead of at the end of July, without attaining complete growth. It was found that all hemp varieties grown in Italy, namely, Carmagnola, Ascolana, Nostrana, etc., are short-day plants. When kept under short-day conditions of about 14 hr., and at suitable temperatures, they will flower in approximately 25-35 days from germination. A high night-temperature was also found to influence positively the early flowering of hemp. The results from pot trials carried out with hemp plants of the Carmagnola variety, indicated that a long photoperiod of more than 17-18 hr., even when associated with high night-temperatures (or low night-temperatures of less than 13° C., when the photoperiod is less than 15-17 hr.), are suitable conditions for the prevention of early flowering and dwarfing of hemp. Early sowing of hemp in Italy favours early flowering, especially in the southern regions where night temperatures are often high. The possibility of early flowering, however, is not excluded even when sowing is delayed until the beginning of April.—E.B.O.

975 DUFRESSE, M. 3. Essai d'engrais sur le chanvre. [**3. Manuring trial with hemp (*Cannabis sativa*).**] *Cahiers Rech. agron. 4. Dir. Agric., Commerce, For., Morocco* 1951, 315-21, bibl. 1. [Received May, 1954]

The results from this trial indicated that the 3 types of manuring tested, organic + chemical manuring, normal chemical manuring and heavy chemical manuring, had an equal effect, as each increased significantly the total stem yield by about 18% (by weight) over the unmanured control. Manuring had no significant effect on the ratio of female stems to total (male and female) stems, this ratio being about 76% by weight, and 57% by number. —E.B.O.

## JUTE

976 SEN GUPTA, J. C. **Studies on the physiology of jute plants. 1. Effect of the time of sowing and vernalization on growth and development of jute plants.** *Agric. Res. Mem. 6. Indian Cent. Jute Comm.* 1953, pp. 22, bibl. 19, illus.

Two species of jute, *Corchorus capsularis* and *C. olitorius* were sown in pots at intervals of one month in 1945 beginning on 15 April, and at intervals of 15 days in 1946 beginning on 1 March. For widely different sowing dates between April and August, flowering was concentrated within the period mid-August to end-September; the vegetative period thus became progressively shorter with progressively later sowings. The height of the plants decreased with progressively later sowings after 15 April. As a result of the experiments the most favourable sowing dates for *C. capsularis* and *C. olitorius* are stated to fall within the periods end-March to end-April and mid-April to mid-May, respectively. It was found possible to induce earliness of flowering, but not improved growth, by means of vernalizing seed at 30°C. for 7 days.—W.J.B.

977 SEN GUPTA, J. C. **Studies on the physiology of jute plants. 2. Mineral nutrition of jute plants.** *Agric. Res. Mem. 6. Indian Cent. Jute Comm.* 1953, pp. 16, bibl. 6, illus.

In experiments during 1945-7, *Corchorus capsularis* and *C. olitorius* were grown in sand cultures to which various mineral solutions were added. For both species the daily increase in height, mean length of internode and circumference of the base of the stem were significantly greater in cases where ammonium sulphate was applied than in those where calcium nitrate was used as a source of N. In experiments in which 3 levels of N, P, K and Ca were applied to the plants, using Hamner's method, the plants responded most clearly to differences in levels of N, higher levels giving greater growth. *C. capsularis* was more sensitive to different levels of P and less sensitive to different levels of K than *C. olitorius.*—W.J.B.

978 MUKHERJEE, M. K. **Jute and soil. 2. Preliminary observations on composting of thinned out jute plants for maintenance of soil fertility.** *Jute Bull.* 1954, **16,** No. 10, 334-6.

The possibility of using compost made from thinned out jute plants as manure was investigated. Quantities of compost ranging from 600 to 2000 lb. per ac. of jute were obtained. The content of total N in jute compost made from plants 15-22 in. in height was about the same as that of town compost (about 0·8%). Owing to the way in which the compost was made (by heaping in the open air) the losses of soluble nitrogenous constituents were high. The phosphate content of the jute compost was comparable with that of town compost and farm-yard manure.—W.J.B.

## KENAF

979 SORENSEN, T. **Kenaf observations 1951-2 at the Lowlands Agricultural Experiment Station, Epo.** *Papua and New Guinea agric. Gaz.* 1953, **8,** No. 2, 15-31, bibl. 13, illus.

The experiment, carried out in 1951-2, was designed to test the suitability of the locality for the growing of kenaf (*Hibiscus cannabinus*) and to determine the effect of plant population on the yields of fibre and seed. The yields of fibre obtained (4032 lb. per ac. from plots sown in November to give a plant density of 40-50 plants per sq. yd.) compare favourably with those reported from other countries. The mean plant densities of the different groups of plots were approx. 42, 23, 11, 6, 6 and 4 plants per sq. yd. The most densely sown group of plots (42 plants per sq. yd.) gave significantly higher yields of fibre than other plots. The coefficient of correlation between plant density and fibre yield was + 0·842. The percentage recovery of fibre was higher (7·92%) on the most densely sown than on any other plots. Plants sown in February, although not harvested for fibre, gave much smaller yields of green matter than the plants (November sown) mentioned above. Seed yields were poor, the average being only 83·6 lb. per ac. November sowings gave seed yields double those obtained from the February-sown plots. Seed viability (12%, 5 months after harvest) was low. Seed yields increased slightly with increasing plant density but the differences just failed to reach the level of significance. The quality of the fibre was not tested. A serious pest of the crop was the tip borer (*Earies* sp.) whose attacks gave rise to branching. The percentage of plants attacked by *Earies* sp. decreased with increasing plant density. —W.J.B.

980 GAUTIER, J. Résultats d'essais sur la culture, la récolte, le décorticage et la préparation des filasses de quelques plantes à fibres libériennes ou foliaires. [**Results from trials on the cultivation, harvest, decortication and the preparation of bast fibre from some plants with stem or leaf fibres.**] *Cot. et Fibr. trop.* 1953, **8,** No. 2, 169-86.

As a result of trials with kenaf (*Hibiscus cannabinus*) at various IRCT Stations, the spacing of 10 × 10 cm. is recommended for this crop. It is thought that kenaf could be grown as far north as the irrigated regions of southern France. It was found that stem canker, a disease of *Urena lobata* caused by the fungus *Physalospora urenae*, does not develop where there is sufficient moisture in the soil. Under the conditions of the Middle Congo, where the first rainy season lasts for about 90 days (October-January), early varieties of *U. lobata* could be grown which should escape this disease. A list is given of varieties of *U. lobata* with their yield after degumming. Although the variety Nigeria of U. *lobata* yields more than the local variety of the Middle Congo, the quality of its fibre is inferior, being comparable to a medium-quality jute. The quality of the fibre of the local variety is superior to jute.—E.B.O.

981 ARNOUX, M. Les plantes textiles secondaires. [**The secondary fibre plants.**] *Cahiers Rech. agron. 4. Dir. Agric., Commerce, For., Morocco* 1951, 423-520, bibl. 60, illus. [Received May, 1954]

General information, based mostly on published works, is given on the following fibre plants which have been tested for several years, with varying results, at the Centre de Recherches Agronomiques, Rabat, and other districts of Morocco: kenaf (*Hibiscus cannabinus, H. esculentus* and *H. sabdariffa*), jute (*Corchorus olitorius* and *C. capsularis*), sunnhemp (*Crotalaria juncea*), *Abutilon avicennae, Urena lobata* and *Gomphocarpus fruticosus.*—E.B.O.

982 ILTIS, J. Comptes rendus des travaux effectués en 1950. Travaux effectués en 1951 sur les plantes textiles secondaires. [**Account of the work carried out in 1950. Work carried out in 1951 with secondary fibre plants.**] *Cahiers Rech. agron. 4. Dir. Agric., Commerce, For., Morocco* 1951, 440-526, illus. [Received May, 1954]

An account is given of trials which are a continuation of those mentioned in the previous abstract.—E.B.O.

983 QUINIONES, S. S. and ORILLO, F. T. **Blight of kenaf.** *Philipp. Agriculturist* 1952, **36,** No. 5, 235-50, bibl. 2, illus. [Received 1954]

Measures recommended for the control of blight of kenaf (*Hibiscus cannabinus*), caused by *Phoma sabdariffae* include: the use of a 2- or 3-year rotation and the omission of roselle (*H. sabdariffa*) from the rotation, burning infected plant material after harvest, and the disinfection of seed with a mercuric chloride solution (1 : 1000).—P.J.B.

984 PATE, J. B. **Resistance in kenaf to *Colletotrichum hibisci.*** *Phytopathology* 1953, **43,** No. 11, 647-8, bibl. 3, illus. [Everglades Exp. Sta., Belle Glade, Fla]

Trials in South Florida showed that lines of *Hibiscus cannabinus* highly resistant to *C. hibisci* could be produced by pure line selection within the El Salvador variety.—P.J.B.

## OTHER

985 COLONIAL PLANT AND ANIMAL PRODUCTS. **The production of cellulose pulp from Commonwealth raw materials. A report from the Natural Resources (Technical) Committee Working Party on Pulp Production.** *Colon. Pl. Anim. Prod.* 1952-3, **3,** No. 4, 331-41, bibl. 9.

Included in a consideration of Colonial raw materials for pulp production is a reference to Yawa fibre derived from the flowering stem of *Vigna sinensis* var. *textilis*, a variety of the common cowpea. This fibre yields paper of outstanding strength.—C.L.S.

# OIL CROPS

## SESAME

986 Kinman, M. L. and Martin, J. A. **Present status of sesame breeding in the United States.** *Agron. J.* 1954, **46,** No. 1, 24-7, bibl. 11. [Texas Agric. Exp. Sta., College Station]

A review is given of the uses and properties of sesame (*Sesamum indicum*) oil, and the yields and area of adaptation of sesame in the USA, together with notes on diseases and pests, genetics, breeding techniques and current progress in developing indehiscent varieties suited for mechanical harvesting.—P.J.B.

987 Mazzani, B. Una nueva variedad de ajonjolí (*Sesamum indicum* L.) producida en el Instituto Nacional de Agricultura. [**A new variety of sesame bred at the National Institute of Agriculture.**] *Agron. trop., Maracay* 1952, **1,** No. 4, 269-77, illus., English summary p. 277. [Inst. Nac. Agric., Maracay, Venezuela]

Varietal trials with sesame (*S. indicum*), carried out at Acarigua and Maracay in 1949-51, are described. A new variety, Acarigua, significantly outyielded other varieties in 2 out of the 3 years and is considered particularly suitable for the district after which it is named. The percentage of oil in the dry matter of the seed grown at Acarigua was 57·8%. The morphological characters of the new variety are described.—W.J.B.

## LINSEED

988 Atkins, R. E. and Reddy, C. S. **Response of flax [linseed] varieties to seed treatment.** *Pl. Dis. Reptr* 1953, **37,** No. 4, 230-1. [Iowa Agric. Exp. Sta., Ames]

In trials during a 3-year period in Iowa, Ceresan M and Panogen were used to treat the seed of 10 linseed varieties. Seed of all varieties treated with Ceresan M and Panogen yielded respective averages of 7·4 and 4·2% more seed per ac. than untreated seed. The greatest yield increase following seed treatment was noted in the case of Minerva, followed by Koto and Redwood. Increases following seed treatment were smallest for Marine and Redwing. Average percentage increases in seed yield of treated plots over untreated plots were similar during each of the 3 trial years.—P.J.B.

## SUNFLOWER

989 Trepačev, E. P. [**Yield and oil-content of sunflower in square-pocket sowings.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 29-32, illus.

The relation between nutrition area and crop yields has been studied at the Spoljansk Varietal Fields, Kiev Province, where it was shown that by increasing the size of the area of nutrition per plant from 1800 to 4900 sq. cm., oil content in sunflower seed decreased from 44·5 to 41·8% while yield of green mass rose from 1730 kg./ha., with an area of 1800 sq. cm. to a maximum of 1900 kg./ha. with an area of 2800 sq. cm. and then declined to approx. 1680 with an area of 4900 sq. cm. This may be explained by changes in the nutrition of the plant which are induced by size of nutrient area, especially in regard to nitrogen. Inter-row cultivation in wide-spaced sowings intensifies soil nitrification and this affects the plants' metabolism, especially in regard to carbohydrate and protein synthesis which increases at the expense of oil-forming processes. Experiments with square-pocket sowings of sunflower made in different regions have shown that there is an optimal area of nutrition which should be determined for each plant in relation to climatic conditions and varietal characteristics. Tabulated data are given showing the relation between pocket size (60 × 60; 70 × 70; 75 × 75 cm., etc.), sunflower variety (VNIIMK 6540 and 1646) and seed yield (kg./ha). The highest seed yield was 2090 kg./ha. obtained in the Kiev Province from VNIIMK 6540 in a square-pocket area of 60 × 60, one plant per pocket, while the lowest seed yield (1460 kg./ha.) was obtained in Nikolaevsk Province from the same variety sown in pockets of 70 × 40 cm., the pockets being placed in rows. There is also tabulated information on percentage of oil in seeds obtained with different sizes of square-pocket sowings made with the varieties VNIIMK 6540, Ždanovskiĭ 8281 and Šortandinsk 41 in different Provinces (Nikolaevsk, Kiev and Kurgansk). The greatest amount of oil (42%) was obtained from the seed of the variety VNIIMK 6540 grown in Nikolaevsk Province with a square-pocket sowing area of 65 × 65 sq. cm., 2 plants per pocket. The lowest oil-content (31·8%) was obtained from seed of the variety Šortandinsk 41 grown in Kurgansk, with a square-pocket area of 60 × 60 sq. cm., 1 plant per pocket. The trials covered in general a period of 3 years.—M.H.

990 Berdušev, A. P. and Lebedeva, N. P. [**Method of determining oil-content of individual seeds of sunflower.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 89-92, illus.

The authors' method is based on the relationship between the specific gravity of the seed and its oil-content: the greater the amount of oil, the less the specific gravity of the seed. The specific gravity of the seed is determined by comparison with that of a salt solution of known concentration. For this purpose sodium chloride is considered the best because its solubility is not dependent on temperature. A sample of seed is taken from threshed material, and the cleaned seed is placed under a covering of water in hermetically sealed vessels connected to a pump. After 5 or 7 minutes, the air is pumped out of the vessels, and as air is drawn out, water enters the seed. The specific gravity of the seed then depends chiefly on its content of oil. The seeds are removed from the vessels, any water on their surfaces being removed by filter paper, and placed in tall, wide vessels into which distilled water is poured until there is a depth of 5-6 cm. over the sample. Any seeds with air-cavities float to the surface and are removed. A saturated solution of NaCl is then added to the water through a burette and the specific gravity of the fluid is gradually increased (from 1·0 g./cm.$^3$). By adding 10 to 15 ml. sodium chloride solution to 100 ml. water, more seeds with air cavities (but low oil-content) float to the surface. Seeds without air cavities which float to the surface in solutions of greater salt concentration contain more oil than seeds with air cavities. Therefore, to select seeds with high oil-content, those with air cavities should again be removed. With the further addition of more concentrated salt solution, seed of normal structure floats to the surface in this sequence: first those with high oil-content, then those with low content. Using the above procedure, a table has been compiled in which the amount of saturated salt solution (in millilitres) added to 100 ml. water is correlated with percentage oil-content of the seed. For example, adding 2·4 ml. of saturated NaCl solution to 100 ml. water selects seed with 80% oil-content; and adding 198·8 ml. of solution to 100 ml. water selects seed with 48% oil-content. In the table published, no consideration has been given to water-content of the seed. As the presence of water results in a slightly higher figure for oil, it is suggested that, in each case, 0·32% oil be subtracted from the figure obtained.—M.H.

## RAPE

991 SCHRIMPF, D. Untersuchungen über den Blüten- und Schotenansatz bei Raps, Rübsen und Senf. [**Investigations on flowering and pod-setting in rape, turnip rape and mustard.**] *Z. Acker- u. Pflbau* 1954, **97,** No. 3, 305-36, bibl. 24. [Inst. Pflbau u. Pflzücht., Stuttgart-Hohenheim]

Three years' observations were made in the field with 2 varieties each of winter turnip rape [*Brassica campestris* var. *oleifera* subvar. *biennis*] and winter rape [*Brassica napus* var. *oleifera* subvar. *biennis*], one variety of summer rape [*B. napus* var. *oleifera* subvar. *annua*] and one variety of yellow mustard [*B. nigra*]. The object of the trials, the results of which are described in considerable detail and summarized in 20 tables, was to determine what external factors are concerned in the flower and pod formation of these crops. The following are some of the principal findings. *Beginning of flowering.* In winter oil-crops, this depends largely upon temperature in spring; the average under Hohenheim conditions should be at least 7·2° C. at 40 days before flowering, or, after a long, hard winter, still higher. In summer oil-plants, a definite sum of warmth is essential, for mustard approximately 535° C. and for summer rape 675° C. *Duration of flowering* depends mainly upon temperature, less upon the amount of precipitation. *Number of flowers.* Kaufmann's flower potential (Kaufmann, *Mitt. biol. Reichsanst.* 1942, No. 66) was attained, and the more vigorous the plant and greater the room given to it, the greater was the number of flowers formed. *Flowers on the lateral shoots.* The longer these shoots, the more numerous the flowers formed upon them. *The time of pod-ripening* in all the crops studied depends on the sum of warmth received from the beginning of flowering to maturity. There is no correlation between beginning of flowering and date of maturity. *The number of pods* depends upon the number of flowers, the number of lateral shoots and the weight of the plant. *The percentage pod-setting*, which is very subject to physiological influences and can be modified by environmental factors, fluctuates under Hohenheim conditions within a definite range and is assumed to be specifically and genetically governed. Only a healthy, normally-developed plant exhibits satisfactory pod-setting. The number of pods per lateral shoot is approximately proportionate to the length of the shoot. On comparing the observations on individual plants with plot yield, a relationship was found to exist between yield and number of pods. The number of pods, the number of seeds per pod, and the number of lateral shoots are the primary factors determining yield; the number of flowers and the height and weight of the plant are secondary factors. Thousand-grain weight, in the crops studied, has no importance in determining yield. A one-year experiment in the growing of summer rape in water cultures showed that the percentage flower- and pod-setting was more affected by partial or complete withholding of different nutrients during certain phases of development than were the weight of seed, root and straw. Diminutions in yield were caused by the lack of some, or all, of the nutrients during early development. After flowering had begun these changes had no more effect. Among the symptoms resulting from boron deficiency were poor flowering or none at all and no pod-setting whatever, but, when boron was added after the plants had shot, the symptoms disappeared and almost normal yields could be obtained.—G.M.R.

992 BONNEMAISON, L. Le charançon des siliques, ennemi du colza. État actuel de la question. [**The pod weevil, a pest of colza** (**in France**).

**Present position.**] *Oléagineux* 1954, **9,** No. 4, 245-50, illus. [Sta. Cent. Zool. Agric., Versailles]

Cultural and chemical methods for controlling the pod weevil (*Ceuthorrhynchus* sp.) on colza [*Brassica napus*] are described. It is recommended that adult weevils be treated with Dieldrin dust, or with Parathion or Lindane, employed either as dust or spray. Preparations with a high concentration of active substance should be used, for instance, 2% Lindane or 2% Parathion, applied at the rate of 25-30 kg. per ha. The best time for treating late colza crops is after 15 April when the weevils have appeared and immediately before full flowering. Early treatment is less harmful to bees than is treatment during full flowering.—E.B.O.

## LAND USE, SURVEYS AND MANAGEMENT

993 HANCE, W. A. **The Gezira : an example in development.** *Geogr. Rev.* 1954, **44,** No. 2, 253-70, illus. [Graduate Sch. of Business, Columbia Univ., Mo.]

Aspects reviewed include : physical features engineering works, methods of irrigation, crops and livestock.—P.J.B.

994 DIGBY, Margaret. **Food and farms in French North Africa.** [**Tunisia, Algeria and Morocco.**] *J. agric. econ. Sci.* 1953, **10,** No. 3. 248-56.

995† SIMONNEAU, P. La végétation des sols salés d'Oranie. [**The vegetation of the saline soils of Oran.**] *Ann. Inst. nat. Rech. agron., Paris. Ser. A. Ann. agron.* 1954, **5,** No. 1, 91-117, bibl., illus. [Serv. Études Sci. Appl. Hydraul., Algiers, N. Africa]

A phytosociological study has been made of the salt steppes in the irrigable area of the plain of Bas-Chéliff and of the modification in the flora after cultivation. The plant population consists chiefly of *Suaeda fruticosa* and *Sphenopus divaricatus*. The modifications of the flora resulting from cultivation are of 3 kinds according to the crop taken. The adventive species which appear after cereal cultivation (chiefly barley) are the most temporary. No matter how perfect the cultivation, the original flora is never completely destroyed, and sheep grazing, which takes place in the second year of fallow, results in a return to the original *Suaeda fruticosa* association. After market-gardening crops, the *S. fruticosa* association reappears after 3 years but is enriched with 2 or 3 new species. The cultivation of rice involves more drastic changes in the condition of the soil and the changes in the flora are more permanent. The new species are *Typha angustifolia*, *Beta macrocarpa* and *Ormenis praecox*. *S. fruticosa* reappears in the year following harvest and is established again in 3 years' time, at first as an open cover and later a close cover. After summer-cultivated crops (sweet sorghum, sugar-beet and cotton) there is no well-defined change in the native flora.—D.B.

996† BUCHANAN, K. **An outline of the geography of the western region of Nigeria.** *Malay. J. trop. Geogr.* 1953, **1,** 9-24, bibl. 9, illus.

The physical geography and agricultural economy of western Nigeria are described. There are maps showing the relief and drainage, geology, soils, natural vegetation, distribution of population, land-use regions and the rice production of the different areas.—W.J.B.

997† BUCHANAN, K. **Recent developments in Nigerian peasant farming.** *Malay. J. trop. Geogr.* 1954, **2,** 17-34, illus.

The effects on Nigerian agriculture of the growth of the agricultural population and of the increase of cash-cropping in response to the growing demand for food by urban populations is discussed. Pioneer development schemes for the cultivation of plantation crops, mechanized production of upland crops, mixed farming, ranching and mechanized swamp-rice growing are described. Settlement schemes embodying controlled systems of land tenure and utilization are being carried out.—W.J.B.

998 IGWE, D. C. **The need for enclosure and land resettlement in Nigerian agriculture.** *Trop. Agric.* 1954, **31,** No. 1, 57-68.

999 MACFADDEN, C. H. **The Gal Oya Valley : Ceylon's little TVA.** *Geogr. Rev.* 1954, **44,** No. 2, 271-81, illus. [Univ. California, Los Angeles]

1000 FERGUSON, D. S. **The Sungei Manik irrigation scheme.** *Malay. J. trop. Geogr.* 1954, **2,** 9-16, illus.

An irrigation and swamp-jungle clearance scheme begun in 1931 is described. The essential conditions for the successful undertaking of such a scheme are : (a) accessibility of the area ; (b) a clay layer underlying peat not more than 5 ft. deep ; (c) that the area can be drained by the excavation of suitable channels. The Sungei Manik area of Malaya is now used for rice growing by peasant cultivators. The area, formerly uninhabited, now has a population of 15,000.—W.J.B.

1001 DE FINA, A. L. and GARBOSKY, A. J.

Difusión geográfica de cultivos índices en el Chaco argentino y sus causas. [**The geographical distribution of index crops in the Argentine Chaco in relation to agroclimatic factors.**] *Tirada Interna 22. Inst. Suelos Agrotec., Buenos Aires* 1952, pp. 63, illus. [Received 1954]

The Chaco region of Argentina is divided into 9 agroclimatic districts according to de Fina's system. [See *Fld Crop Abstr.* 5 : 543 and 6 : 738.] The results of an agro-ecological survey of the region, based on information on the abundance and performance of 18 index plants in 42 localities, are presented. The index plants comprise 12 perennials and 6 annuals : cotton, maize, wheat, oats, barley and melon. The abundance and performance of each index plant in each locality is illustrated by maps and discussed with reference to climatic and other environmental conditions.—W.J.B.

1002 De Fina, A. L. and Garbosky, A. J. Difusión geográfica de cultivos índices en la Provincia de Santiago del Estero y sus causas. [**The geographical distribution of index crops in the Province of Santiago del Estero, Argentina, in relation to agroclimatic factors.**] *Tirada Interna 25. Inst. Suelos Agrotec., Buenos Aires* 1953, pp. 67, illus.

The Province of Santiago del Estero is divided into 7 agro-climatic districts according to de Fina's system. [See *Fld Crop Abstr.* 5 : 543 and 6 : 738.] The results of an agro-ecological survey based on the distribution and performance of index crops are presented in the way described in Abs. 1001.—W.J.B.

1003 De Fina, A. L. and Garbosky, A. J. Difusión geográfica de cultivos índices en la Provincia de Santa Fe y sus causas. [**The geographical distribution of index crops in the Province of Santa Fe, Argentina, in relation to agroclimatic factors.**] *Tirada Interna 24. Inst. Suelos Agrotec., Buenos Aires* 1953, pp. 67, illus.

The Province of Santa Fe is divided into 9 agroclimatic districts according to de Fina's system. [See *Fld Crop Abstr.* 5 : 543 and 6 : 738.] The results of an agro-ecological survey based on the distribution and performance of index crops are presented in the way described in Abs. 1001.—W.J.B.

1004 Weaver, J. C. **Crop-combination regions in the Middle West.** *Geogr. Rev.* 1954, **44,** No. 2, 175-200, illus. [Geogr. Dep., Univ. Minnesota, St. Paul]

The results are given of an analysis of crop-combination regions in the north-central states of the USA and areas on their margins. The statistical methods used to arrive at the crop-combination data are reviewed in detail. A coloured map is given showing regional crop-combination distributions in 1939 and 1949.—P.J.B.

1005 † Buringh, P. **The analysis and interpretation of aerial photographs in soil survey and land classification.** *Neths J. agric. Sci.* 1954, **2,** No. 1, 16-26, bibl. 23, illus. [Internat. Train. Cent. Aerial Surv., Delft, Neths]

An explanation is given of methods of aerial photography by the aid of which the quantity of field work required for the production of soil and land classification maps of large undeveloped areas can be reduced by 75%.—W.J.B.

1006 Netherlands. Landbouw - Economisch Instituut. Rapport No. 204. Onderzoek naar de kostprijzen van akkerbouwproducten in enkele kleigebieden en de veenkoloniën. [**Report No. 204. Enquiry into the cost of production of arable crops in certain regions of clay and peat soils.**] 1954, pp. 103. [Hague]

## FARMING SYSTEMS AND PRACTICES

1007 Boguslawski, E. v. Zwischenfruchtbau und Bodenfruchtbarkeit. [**Catch-cropping and soil fertility.**] *Sonderh. Landw. Forsch.* 1953, **4,** 181-200, bibl. 15. [Giessen]

The mutual relations of catch-cropping and soil fertility are discussed as affected by the measures to be taken to ensure successful catch-cropping, by ground cover, water relations, nutrient relations, and by the organic matter and fertilizer effect of the catch crop, legumes in particular. Reference is made to the literature and to several experiments. —G.M.R.

008 † Čiževskiĭ, M. G. and Kosinskiĭ, V. S. [**Effectiveness of crop rotations in the southern Kuban.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 10-17.

1009 † Pervov, M. [**Deficiencies in crop rotations of the collective farms in Čuvaš, ASSR.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1953, **24,** No. 12, 59-63.

1010 South Australia. Waite Agricultural Research Institute. **Agronomy and agrostology. 3. Influence of pastures and forage crops on the yield of wheat grown in rotations of varying duration.** *Rep. Waite Agric. Res. Inst.*

*and associated activities of the Commonw. sci. industr. Res. Org. 1950-51* Adelaide, 1953, 5-6. [S. Australia]

The following rotations were tested in 1947-51: (a) fallow/wheat, (b) peas (grazed)/wheat, (c) pasture for 2 years/fallow/wheat, (d) pasture for 3 years/wheat, (e) pasture for 6 years/wheat/wheat. The pastures were based on subterranean clover and Phalaris. The yield of wheat from (a) (24·6 bu. per ac.) was no greater than that from (b) over a period of 5 years. Rotation (c) gave a wheat yield of 35·4 bu. per ha. but, as only one crop of wheat was grown per 4 years, the total wheat production per ac. was only 72% of that obtained from rotations (a) and (b). Rotation (d) gave wheat yields of only 29·7 bu. per ac. but yielded 2·5 more tons of grass per ac. (dry matter) in the course of the 4 years' rotational cycle than (c). The elimination of fallow from the 2-course rotations and from the 4-course rotations increased production in each case. The value of rotation (e) has not yet been assessed. Of the rotations assessed, (d) is considered the most productive: it yielded, in the course of 4 years, 19·4 bu. less grain but 3·5 tons more dry forage per ac. than (b) the peas/wheat rotation.—W.J.B.

1011† JEFFERSON, J. H. **Hafirs or development by surface water supplies in the Anglo-Egyptian Sudan.** *Trop. Agric. Trin.* 1954, **31,** No. 2, 95-108, illus.

The excavation of small water-reservoirs (hafirs) in areas of the Sudan suitable for stock-raising or rain-fed agriculture is described.—W.J.B.

1012 DEUTSCHE LANDWIRTSCHAFTLICHE PRESSE. Zweimal Ernten durch Erdwürfel. [**Two crops by the "soilball" method.**] *Dtsch. Landw. Pr.* 1954, **77,** No. 6, 79, illus.

Szebeny's method of transplanting crop plants previously sown in balls of soil and then forced, reduces by several months the period during which the plant is in the ground. Two-year trials of this method have established its usefulness in agriculture as well as in horticulture. Sunflower and maize are not only raised with less labour, but two crops per year can be harvested from the same land. It is also possible to obtain crops in climates which are considered to be too raw or at altitudes which are too high for the normal cultivation methods. A sugar-beet and fodder-beet crop can be obtained after a main crop, and in the case of fodder-beet the economy in labour costs is marked. Crops which hitherto have been grown only as a main crop can, by this method, be grown as a second crop following winter rye, winter wheat, early potato and rape. The success of the method depends on making the "soil balls" correctly and on the treatment of the plant from sowing in the balls to transplanting in the field. The ingredients used and the process for making the soil balls are described.—D.B.

1013 NYE, P. H. **A survey of the value of fertilizers to the food-farming areas of the Gold Coast. Pt 2. The granitic soils of the Far North.** *Emp. J. exp. Agric.* 1953, **21,** No. 84, 262-74, bibl. 4.

The average responses of the main crops of the region to superphosphate and ammonium sulphate were determined in numerous trials on cultivators' farms. The present yields of groundnuts can be increased by 61% and those of cereals (sorghum and millets) by 52% by applying 120 lb. per ac. of superphosphate. The present yields of sorghum and millets can be increased by 29% by applying 120 lb. per ac. of ammonium sulphate. The average yield on land occasionally receiving kraal manure was more than 50% greater than on unmanured land, but there was little difference between the response to artificial manures on land receiving, and on land not receiving, kraal manure.—W.J.B.

1014 LEEUWE, A. van. De arbeidsprestaties van paarden voor de grondbewerking, vergeleken met die van runderen en karbouwen. [**A comparative study of the performances of horses, oxen and buffaloes used for drawing cultivation implements in Indonesia.**] *Landbouw* 1952, **24,** No. 1-3, 19-57, bibl. 1-13, illus. [Inst. Anim. Husb., Bogor, Indonesia]

The average hourly capacity of Indonesian horses, oxen and buffaloes, when used for ploughing and harrowing, on irrigated and dry lands, was calculated in tests made in 1951. Horses, when ploughing, performed about 25% more work per hr. than buffaloes, and 20% more than oxen. Horses are especially recommended for use in areas where the rainy season is short and the time available for cultivations limited.—W.J.B.

1015 SEMKIN, G. [**Construction and utilization of irrigation areas on collective farms of the Voronež Province.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1953, **24,** No. 12, 46-51.

## WEEDS AND WEED CONTROL

(*See also under individual crops.*)

1016 PETERS, R. A. **Some factors involved in the chemical control of quackgrass.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 257-64, bibl. 2. [Storrs Agric. Exp. Sta., Conn.]

In trials in Connecticut on Charlton fine sandy loam, single and split applications of NaTCA were made to ploughed and unploughed plots infested with *Agropyron repens*. The applications were made at different dates during the year, the second application of split treatments being made several weeks after the initial treatment. Ploughing before treatment markedly enhanced the effectiveness of the herbicide. Differences between dates of treatment in terms of herbicidal effectiveness were largely due to the nature of the rainfall following the treatments. Amounts of 1·5-3 in. of rain, shortly after treatment, followed by a relatively dry spell, appeared to give the best results. Too much rain leached the TCA out of the reach of the *A. repens* rhizomes, while too little did not carry it far enough into the soil. The advantages of split treatments were that they increased the chances of obtaining suitable rainfall conditions following treatment. In further trials, comparisons between TCA and Dalapon were made. Spaded and non-spaded plots were treated with 10 and 20 lb. of each material on 17 June and 20 July. Within 4 weeks after the 17 June treatment, 2·51 in. of rain fell, while 5·43 in. fell after the 20 July treatment. The 17 June applications were effective in the case of both materials. Dalapon was superior to TCA when applied to the foliage of *A. repens*; on spaded plots, it had no notable advantage over TCA. Dalapon was relatively less affected by the rainfall pattern than was TCA.—P.J.B.

1017 MOORE, R. M. **Studies on perennial weeds: the selective control of hoary cress (*Cardaria draba* L. Desv.) in wheat.** *J. Aust. Inst. agric. Sci.* 1953, **19,** No. 4, 241-3, bibl. 4. [Div. Pl. Industr., CSIRO, Canberra]

The grain yield of wheat on land infested with hoary cress was increased by 28% or 3·5 bushels per acre from the use of aqueous sprays containing 1 lb. MCPA acid equivalent per acre. Higher rates had some toxicity to wheat, and some of the increase in yield due to the weed control was thereby lost. The greatest reduction in weed density in the following year resulted from the highest dosage level, 5 lb. per acre. A second application of MCPA one year after the first greatly increased the degree of hoary cress control, which was not significantly influenced by the dosage level of the first application. Two relatively light applications effected a reduction of 70% three years after the second spraying.—G.M.R.

1018 BRUNS, V. F. and RASMUSSEN, L. W. **The effects of fresh water storage on the germination of certain weed seeds. 1. White top, Russian knapweed, Canada thistle, morning glory and poverty weed.** *Weeds* 1953, **2,** No. 2, 138-47, bibl. 15, illus. [Irrigation Exp. Sta., Prosser, Washington]

Experiments were carried out to determine: (a) whether the seeds of *Cardaria draba* var. *repens*, *Centaurea repens*, *Cirsium arvense*, *Convolvulus arvensis* and *Iva axillaris* would maintain their viability in running water and (b) whether the seed of such species would germinate in the field after being held in water in reservoirs and canals for different periods. Data are given of the germination of the above species after 22 months' dry storage. Following storage in fresh water, 52 and 88% of *Cardaria draba* seed had germinated after 1 and 2 months, respectively; after 6 months' storage, 98% of the seed had germinated. After 22 months' storage, 27·5 and 44·5% of *Cirsium arvense* and *Iva axillaris* seed, respectively, were no longer viable. In the case of *Convolvulus arvensis* and *Centaurea repens*, over 80% of the seed remained viable after 22 months' storage. There was an inverse relation between the temperature of the water in which the seed was held and germination. There were no consistent differences between the germination responses of seed held in water at depths of 12 or 48 in. It was concluded that a relatively high percentage of the seed of *Cirsium arvense*, *Centaurea repens*, *Convolvulus arvensis* and *Iva axillaris* would remain viable after storage in fresh water for 22 months, and would produce plants when subjected to suitable germination conditions in the field.—P.J.B.

1019 LOUSTALOT, A. J. and others. **Effect of CMU on nutgrass (*Cyperus rotundus* L.).** *Weeds* 1953, **2,** No. 3, 196-201, bibl. 4, illus. [Fed. Exp. Sta., Mayaguez, Puerto Rico]

The results of 3 experiments are given. In the first, an area infested with nutgrass was divided into 2 blocks, one of which was ploughed to a depth of 6 in. and the other not ploughed. Spray applications of nil, 20, 40 and 80 lb. CMU as 80% wettable powder per ac. were made. Nutgrass on unploughed plots recovered gradually in all cases after 5 months. The 80 lb. CMU per ac. treatments killed 80-90% of the tubers present on ploughed soil, but enough survived to reinfest the plots. In the second experiment, nutgrass tubers were placed at depths of 1, 2, 4, 6, 8, 10, 12 and 15 in. in soil in pots. Water was applied to raise the moisture content of the soil to field capacity, then 40 lb. CMU per ac. were applied. Counts of live and dead tubers were taken 1, 2 and 5·5 months after treatment. On untreated soil, tubers planted 1-8 in. deep increased 9- to 11-fold, while those planted 8-15 in. deep increased 7- to 8-fold. Tubers planted 1 and 2 in. deep and treated with CMU were completely killed. Those at 4 in. deep increased slightly in numbers, but were shrivelled. These, when planted 6-12 in. deep, showed little or no increase in numbers, while those at 15 in. deep increased 3-fold in numbers. It was evident that CMU could eradicate tubers up to 4 in. deep and affect the growth of those from 4 to 15 in. deep in the soil. In a third experiment, applications of 20 and 40 lb. CMU, 20 lb. CMU + 2,4-D, CMU + 2,4,5-T, CMU + 2,4-D + 2,4,5-T, 40 lb. TCA and 5 lb. 2,4-D per ac. were made to plots ploughed twice, with a 6-week interval, and to plots ploughed three times with 6- and 8-week intervals, the herbicides being applied at the above rates after each ploughing. Nutgrass tuber numbers in all plots receiving 20 or 40 lb. CMU per ac. were very low, while those in plots receiving 40 lb. TCA, or 5 lb. 2,4-D per ac. were 600 and 250 per sq. ft., respectively. Nutgrass tuber numbers were reduced as effectively by ploughing and spraying with 20 lb. CMU per ac. twice, as spraying three times with 40 lb. CMU per ac. ; following the first-mentioned treatment, only occasional live tubers remained 4 months after the final ploughing.—P.J.B.

1020† BORDELEAU, R. Observations sur la destruction du souchet comestible. [**Observations on the control of the edible cyperus.**] *Rev. Oka* 1954, **28,** No. 1, 8-10. [Sta. Exp. Assomption, Quebec]

Difficulty is being experienced at the above station in controlling the edible cyperus (*Cyperus esculentus*) in hoed crops, on imperfectly drained soils. Trials of herbicides were started in 1946. Information is given on their effect on the edible cyperus. TCA at the rate of 100 lb. per acre and CMU at the rate of 10 lb. per acre gave complete control, but more trials are needed to determine the most suitable time of application for each crop.—E.B.O.

1021 MOORE, R. J. and FRANKTON, C. **Cytotaxonomy of three species of *Centaurea* adventive in Canada.** *Canad. J. Bot.* 1954, **32,** No. 1, 182-6, illus. [Bot. and Pl. Path. Div., Sci. Serv., Canada Dep. Agric., Ottawa]

1022 JOHNSON, R. T. **The problem of volunteer beets.** *Spreckels Sug. Beet Bull.* 1953, **17,** No. 5, 36-7, illus.

A note is given of the growing problem of volunteer annual sugar-beet plants in certain districts of California, together with summarized recommendations for their control.—P.J.B.

1023 MUENSCHER, W. C. and SCHUMACHER, G. J. **List of weeds of New York.** *Ext. Bull. 891. Cornell agric. Exp. Sta.* 1953, pp. 16, bibl. 4.

The list includes 413 items, with common and scientific names, duration of growth cycle and prevalence in New York State.—P.J.B.

1024 VENGRIS, J. **Weed populations as related to certain cultivated crops in the Connecticut River Valley, Mass.** *Weeds* 1953, **2,** No. 2, 125-34, bibl. 12. [Massachusetts Agric. Exp. Sta., Amherst]

The studies reported were made to survey the weed populations of tobacco, onion, potato and maize fields in the Connecticut River Valley. Weed species listed include 34 occurring in onion, 39 in tobacco, 55 in potato and 66 in maize fields.—P.J.B.

1025† DOUGALL, H. W. **The chemical composition of three "weeds" in the Kenya highlands.** *E. Afr. agric. J.* 1954, **19,** No. 3, 152-3, bibl. 18.

The chemical composition is given of three Kenya weeds : spurrey (*Spergula arvensis*), plantain (*Plantago lanceolata*) and campion (*Silene gallica*). Their value as fodder plants is discussed.—C.L.S.

1026 WEINTRAUB, R. L. and others. **Studies on entry of 2,4-D into leaves.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 5-10. [Chem. Corps Biol. Lab., Camp Detrick, Frederick, Md]

Three methods of measuring the entry of 2,4-D into plant leaves were used, including : (a) the use of plant response as a criterion, (b) the recovery of non-absorbed 2,4-D from leaf surfaces and its determination by spectrophotometer and (c) techniques using radioactive 2,4-D. Observations were made on the use of non-ionic, cationic and anionic surfactants with 2,4-D. In the presence of optimum concentrations of anionic and non-ionic surfactants, such as Tween 20, only 7% as much 2,4-D was required to produce a standard plant response in beans as that required when no surfactant was used. 2,4-D + Tween entered leaves at an approximately constant rate during the first few hours after application ; thereafter, the rate of entry steadily declined. There was virtually no entry of 2,4-D into leaves where the initial pH of the solution was above 5. The presence or absence of stomata was the major factor affecting the entry of 2,4-D in the case of isolated leaf cuticles, though it was doubtful if these results could be applied to the cuticles of intact leaves. Studies with bean leaves in different growth stages indicated that the leaves passed through a brief phase during which they absorbed large amounts of 2,4-D followed by a phase during which absorption declined markedly. There was no significant effect of light treatment on the absorption of 2,4-D by leaves. 2,4-D was absorbed more rapidly by turgid leaves than by leaves in a state of incipient wilting. The rates of entry of 2,4-D into bean and millet leaves were similar. In trials with cotton, the use of surfactants with alcoholic solutions of 2,4-D did not enhance absorption by the leaves, as in the case of bean leaves. Cotton appeared to be more responsive than beans to 2,4-D ester vapour. It was concluded that though uncertainty still exists as to the precise mechanism of entry of 2,4-D into leaves, entry is mainly through the leaf cuticle, though leaf stomata may also admit it.—P.J.B.

1027 WEINTRAUB, R. L. **2,4-D. Mechanisms of action.** *J. agric. fd Chem.* 1953, **1**, No. 3, 250-4, bibl. 44. [Chem. Corps Biol. Lab., Camp Detrick, Md]

1028 HOLLY, K. **Morphological effects on plants due to damage by growth-regulator weed-killers.** *Pl. Path.* 1954, **3**, No. 1, 1-5, bibl. 10. [A.R.C. Exp. Agron. Unit, Dep. Agric., Oxford]

A general review is given of the visible morphological effects on plants of sub-lethal applications of 2,4-D, MCPA and 2,4,5-T.—P.J.B.

1029 HANSEN, J. R. and OGLE, R. E. **Response of eighteen plant species to DPA (3,4-D), 2,4-D and MCP.** *Proc. 8th Northeast. Weed Contr. Conf.* 1954, 29-31, bibl. 4. [Hercules Powder Co., Wilmington, Del.]

Pre- and post-emergence applications of DPA, 2,4-D and MCPA were made to a number of crops, including sunflower, cotton, potatoes, snap beans, sugar-beet, linseed, soyabeans, buckwheat, oats, barley, millet and rape, grown on fertile silt-loam soil in Delaware. The plots were covered with a uniform stand of *Amaranthus retroflexus*. Following pre-emergence sprays with DPA and 2,4-D, mean injury ratings for all crops, expressed as percentages of maximum possible injury, were 38 and 66 ; following post-emergence treatments of the ester formulation of DPA and 2,4-D, ratings were 36 and 53% and following similar treatments with amine formulations, 29 and 39%, respectively. These data showed that differences between DPA and 2,4-D were much greater following pre-emergence than following post-emergence treatments. DPA differed from 2,4-D and MCPA in its selective toxicity. DPA was highly toxic to soyabeans and snap beans, but not to lucerne. DPA was more toxic to linseed, but less toxic to buckwheat and *A. retroflexus* than were MCPA or 2,4-D. All herbicides were highly toxic to sunflowers. DPA tended to be less toxic to Gramineae than 2,4-D, though differences were not great.—P.J.B.

1030 NEWMAN, A. S. and DERIGO, H. T. **Action of isopropyl N-phenyl carbamate under various conditions.** *Weeds* 1953, **2**, No. 3, 169-77, bibl. 11. [Biol. Lab., Chem. Corps, Camp Detrick, Frederick, Md]

The results are given of a series of experiments to determine the effectiveness of IPC as a herbicide under a range of environmental conditions and to compare the effectiveness of different formulations of IPC, CIPC and CMU. Winter-sown and spring-sown cereals, as representative of the Gramineae, were used to evaluate the materials, which were applied as sprays in the case of IPC, CIPC and CMU and also as pellets (weight ranging from 2·6-5·8 mg.) in the case of IPC. In the case of spring-sown cereals, the greatest degree of injury frequently occurred following herbicidal treatment at other than the seedling stage. The extent of injury following IPC treatment was greatly modified by soil environmental conditions. The greatest effect of IPC and the other herbicides was obtained under conditions where losses through volatilization or decomposition were smallest. Applying the herbicides as sprays to warm soil, not followed by rain within a few days of application, resulted in reduced effectiveness through losses of herbicidal material. The greatest degree of injury to autumn-sown cereals followed herbicidal applications made in late autumn or winter. It was considered that for the control of perennial, winter annual, or biennial grassy weeds, winter treatments would give the best results. There was evidence that IPC was most effective in sandy soils, and least effective in soils containing a high content of organic matter. IPC in pellet form was, in most cases, more effective than in aqueous spray form. It appeared essential that the pellets should have good dispersive qualities in the soil. CIPC and CMU were more persistent in the soil than IPC.—P.J.B.

1031 GEORGE, D. K. and others. **Carbamate herbicides. Relative herbicidal and growth modifying activity of several esters of N-phenylcarbamic acid.** *J. agric. fd Chem.* 1954, **2**, No. 7, 356-63, bibl. 22. [U.S. Industr. Chem. Co., Div. Nat. Distil. Prod. Corp., Baltimore, Md]

Data are given of the herbicidal and growth-modifying properties of a number of carbamate compounds analogous to IPC, as determined in screening tests with a range of dicotyledonous and monocotyledonous crop- and weed-species.—P.J.B.

1032 BLOUGH, R. and FULTS, J. **The influence of soil type on the selective action of Chloro-IPC and sodium TCA.** *Weeds* 1953, **2**, No. 2, 119-24, bibl. 5, illus. [Colorado Agric. Exp. Sta., Fort Collins]

Three soil types were used in these studies, namely Valentine loamy fine sand, Fort Collins loam and Terry silty-clay loam. Samples of these soils were pulverized and placed in wooden flats. The following crops were grown on the soils : sugar-beet, onions, lucerne, sweet-clover [*Melilotus* sp.], barley, crested wheatgrass [*Agropyron cristatum*], foxtail millet [*Setaria italica*] and wild oats [*Avena fatua*]. Irrigation was applied after sowing to bring the soils to field-moisture capacity. 24 hr. after sowing CIPC was applied at rates of 3, 6, 9 and 12 lb. per ac. and Na TCA at rates of 5, 10 and 15 lb. per ac. The flats received 0·5 in. irrigation water every 3 days to ensure vigorous plant growth. On Fort

Collins loam, TCA at rates of 5, 10 and 15 lb. per ac. strongly inhibited all annual-grass growth, but did not affect sugar-beet or lucerne. On Terry clay and Valentine sand, rates above 5 lb. TCA per ac. seriously inhibited the growth of sugar-beet and lucerne; the 5 lb. per ac. rates also resulted in some growth inhibition. With CIPC, results were similar. Rates as low as 3 lb. per ac. on Valentine sand and 6 lb. per ac. on Terry loam resulted in non-selective phytotoxicity. On Fort Collins loam, rates up to 9 lb. CIPC still produced considerable selective action. Fort Collins loam contained high contents of nitrate, P and total organic matter, compared with the other two soils. It was considered possible that organic colloids absorbed a high proportion of the herbicides on the Fort Collins loam.—P.J.B.

1033 Ries, S. K. **A theory for the selective mechanism of Chloro IPC.** *Weeds* 1953, **2,** No. 2. 155-8, bibl. 4, illus. [N.Y. State Coll. Agric., Ithaca]

The results of experiments on the effect of CIPC on plants are briefly presented. They are thought to support the hypothesis that the mechanism operating in plants resistant to CIPC depends on a substance, or substances, produced by the plants, which depresses the activity of CIPC both inside and outside them.—P.J.B.

1034† Riepma Kzn, P. Spuittechniek en weersomstandigheden. [**Spraying technique and weather conditions.**] *Landbouwk. Tijdschr., Wageningen* 1954, **66,** No. 2, 99-107, bibl. 6, illus., English summary p. 107. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

Factors influencing the effectiveness of weed control achieved by the use of DNOC solutions in water were studied in laboratory experiments. The arithmetical product of the quantity of water used and the concentration of DNOC required to give an 84% kill of rape (*Brassica napus*) seedlings, used as test-plants, was found to be constant (at rates of application of water above a certain minimum quantity) for given spray-pressures and sizes of nozzle-opening; thus, in general, small decreases in the quantity of water applied to the weeds can be compensated for by the use of slightly higher concentrations in the water of DNOC, but below certain minimum rates of water-application small reductions in the quantity of water applied can be compensated for only by large increases in the concentration of DNOC used and control of *B. napus* becomes irregular and uncertain. The minimum rate of application of water containing DNOC required to give control of *B. napus* is lower when relatively small, as opposed to relatively large, nozzle-openings are used. The minimum rates of application of water containing DNOC required for the control of most weeds are probably higher than those required for the control (84% kill) of *B. napus* seedlings, which are very susceptible to DNOC. The influence of the moisture-deficit of the air on the control of chickweed [*Stellaria media*] by DNOC was also studied. The control of the weed by a 0·6% concentration of DNOC in water applied at a rate of 500 l. per ha. became progressively less effective with increasing moisture-deficits. In a further experiment, the influence of the stage of growth of chickweed on the resistance of the weed to DNOC at concentrations of 0·4 to 1% in 500 l. per ha. of water was studied. The degree of concentration of DNOC required to give control of chickweed and the time required for a given concentration to give a 50% kill increased rapidly after the weeds passed beyond the 2·3 cm. stage of growth.—W.J.B.

1035 Brown, W. H. and others. **Note on a physiologically active pseudourea.** *Canad. J. agric. Sci.* 1953, **33,** No. 6, 622. [Ontario Agric. Coll., Guelph]

A brief note is given on 3,3-di-(4-chlorophenyl)-2-methyl-pseudourea, which is similar to CMU in respect of its physiologic effect on plants.—P.J.B.

1036† World Crops. **Dalapon. A new plant growth regulating substance.** *World Crops* 1954, **6,** No. 3, 103-6. [Dow Chem. Co., Midland, Michigan, USA]

Trials are now in progress at State and Federal Experimental Stations in the USA to determine the value of a promising new herbicide, Dalapon, a sodium salt of 2,2, dichloropropionic acid. From preliminary reports it appears that Dalapon is especially useful for the control of grass weeds of field crops. The following summary is made of preliminary reports on Dalapon: (a) grasses become increasingly insensitive to Dalapon with increasing age; (b) Dalapon appeared less effective on grasses growing under dry conditions than on actively growing succulent grasses; (c) grasses of the cool temperate climates such as *Poa pratensis* and *Agropyron repens* were effectively controlled by applications of Dalapon in early spring when the weather was still cool; (d) the seed stalk development of grasses was arrested or prevented by the application of the herbicide at or before the boot stage; (e) it is not yet possible to classify crops according to their resistance to Dalapon. Lucerne, beets and potatoes may tolerate overall sprays. Maize and cotton appear to tolerate basal spraying. Soyabeans and certain forage legumes such as Ladino clover and red clover are rather sensitive to Dalapon. Rates of application varied from 8 to 60 lb. per ac.—W.J.B.

# CROP BOTANY

(*See also under individual crops.*)

1037 Schweitzer, R. Une nouvelle technique opératoire pour la printanisation des semences par la chaleur. [**A new technique for vernalizing seeds by heat**.] *C. R. Acad. Agric. Fr.* 1954, **40,** No. 2, 99-100. [Ecole Agric., Lancosme, Indre, France]

Vernalization by heat, in which seed is subjected to 20, 25 or 30°C. for 20-30 days, humidity being 75%, is commonly attended by two disadvantages, namely, the development of much mould, especially in certain spp. such as Petkus rye, and so great an acceleration of germination that the seedlings soon become unplantable. An apparatus is described which ensures a movement of the seed in the heating chamber, continuous for large seed such as lupins, maize or wheat, intermittent for smaller seed. The treatment is found to reduce the appearance of mould to practically nil and to retard germination very greatly. Some results obtained from vernalization by this technique are as follows: in peas, spring-sown vetch and cotton flowering was accelerated by 9-14 days; in peas and vetch yield was increased by 175-240%, in comparison with untreated plants.—G.M.R.

1038 Brown, W. V. **A preliminary study of the staining of plant cells by tetrazolium chloride.** *Bull. Torrey Bot. Cl.* 1954, **81,** No. 2, 127-36, bibl. 18. [Pl. Res. Inst., Univ. Texas, Austin]

Studies are reported on the intracellular structures of a number of plant species which become stained when treated with tetrazolium chloride and on the specificity of tetrazolium chloride as an indicator of the presence of certain enzymes in plant tissues. From the results of these studies, it appeared probable that tetrazolium chloride was not a specific test for the presence of reducing enzymes. It was shown that fat droplets in non-viable embryos could take up formazan formed from the reduction of tetrazolium chloride, which could account for the inexactness of the tetrazolium chloride test for seed viability under certain conditions.—P.J.B.

1039 Haferkamp, Mary E. and others. **Studies on aged seeds. 1. Relation of age of seed to germination and longevity.** *Agron. J.* 1953, **45,** No. 9, 434-7, bibl. 27, illus. [Washington Agric. Exp. Sta., Pullman]

Data are given of the germination of the seed of a number of wheat, oat, barley, rye, maize, pea, soyabean, linseed and mustard varieties after storage at air temperatures in unsealed containers at the Dry Land Experiment Station, Lind, Washington. After a storage period of up to 33 years under these conditions, barley, wheat, oat, pea and maize seed remained viable. Among the cereals, barley retained its viability longest, followed by wheat and oats. There were considerable differences in viability between varieties of a given species and between genera. Pea and soyabean seed retained their viability well. Linseed and mustard seed retained their viability well after 9 years' storage. Viability was retained better in seed stored with hull or chaff intact than in threshed seed; also, seed germinated in the hull had less mould growth than that germinated immediately after removal of the hull.—P.J.B.

1040 † Ščerbakov, B. I. [**Fluctuation in the water capacity of leaves during the course of the day.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **93,** No. 1, 197-200, bibl. 6.

This study of the water regime in plants was made with the object of elucidating the interaction of factors which determine the plants' resistance to drought. The work was carried out under field conditions on an unirrigated experimental plot of the Illiĭsk Scientific Research Base, Academy of Sciences, Kazah SSR, located at the foot of a spur in the Džungarsk Ala-Tau. The plants studied belonged to different ecological groups, namely: mesophytes (the wheat variety Erythrospermum 841, and species of *Solanum*, *Achillea*, *Sophora*); ephemerals (including *Bromus tectorum* and *Carex* sp.); and xerophytes (species of *Artemisia*, *Kochia*, *Ceratocarpus*, together with *Agropyron sibiricum*). The water capacity of the leaves was determined by Litvinov's saturation method and the tests were replicated 6 times for wheat, and 3 times for the wild plants. The amount of bound water was determined by Večer's method, and water-soluble carbohydrates by Bertran's method. In the 3 ecological groups the water content in the leaves declines at 1.0 p.m. (compared with 7.0 a.m.) and this is accompanied by an increase in water-holding capacity which then declines towards evening (6.0 p.m.) although it does not at this hour descend to the morning level. There is a discussion of the data in the light of Novogrudskiĭ's work. [*Herb. Abstr.* 17 : 802.]—M.H.

1041 † Duin, B. H. A. van. De waterbehoefte der gewassen. [**The water requirements of crops.**] *Landbouwk. Tijdschr., Wageningen* 1954, **66,** No. 4, 240-3, bibl. 7, illus. [Physiol. and Met. Lab., Wageningen]

A study was made in 1947-51 of the relationship between the yields of field crops and pastures and the rainfall deficiency for the summer period (the difference between potential evapotranspiration and the sum of the supply of water in the soil at the beginning of the period plus the rainfall during the period). Graphs illustrate the difference between potential evapotranspiration and rainfall and show the rainfall deficiency during the summer period of each year. In only one summer (1947, the year when the greatest rainfall deficiency was recorded) was rainfall deficiency associated with low yields. The yields of field crops obtained in 1949 (a year characterized by extremely dry weather in June and July) were not lower than those of the wet years 1950 and 1951 when rainfall deficiencies in those months were small. The yields of grass were depressed in 1949 compared with yields in 1950 and 1951.—W.J.B.

1042 Bergmann, W. Wurzelwachstum und Ernteertrag. [**Root growth and harvest yield.**] *Z. Acker- u. Pflbau* 1954, **97,** No. 3, 337-68, bibl. 95, illus. [Landw. Chem. Inst., Univ. Jena]

A study was made of the factors which promote or hinder root growth and of possible measures whereby these may be influenced. A large number of experiments is described to illustrate the author's findings, and four aspects of the subject are discussed. 1. Carbon dioxide. All circumstances which tend to increase the amount of $CO_2$ within the rhizosphere reduce, and all measures which promote the removal of $CO_2$ encourage, the lengthening of roots. This is discussed in relation to ploughing technique and to the soil's supply of lime and humus. 2. Nutrients in the soil. Root lengthening is inhibited in seedlings, although the formation of lateral roots is encouraged, by an excess of N, K, or, to a less extent, of phosphoric acid ; but phosphates in the form of Ca salts encourage rooting in seedlings. 3. Soil moisture. When this is high during the early development of the plant and is followed by dry conditions, both root growth and subsequent yield are considerably reduced. 4. Time of applying N. A split application in spring gives the best results in root growth and yield. Some practical hints for the farmer are listed.—G.M.R.

1043 Chakravarti, S. C. **Anatomy of roots and shoots of *Brassica campestris* L. in relation to vernalization.** *Nature, Lond.* 1954, **173,** No. 4400, 407-8, bibl. 8, illus. [Bot. Dep., Balwart Agric. Coll., Agra]

Results are summarized of further studies carried out on the work reported in *Curr. Sci.* 1950, 19, p. 319, in which the comparative anatomy of plants raised from vernalized and normal seeds of mustard is reported. The data indicate that the substance or substances formed during chilling are not direct flower-forming substances, and they differ from those synthesized in the leaves during photoperiodic treatment.—M.H.

1044 Nikki, I. **Studies on the broken root of some crops caused by the formation of the icicle layer and on the protecting methods. 1. The manifestation on the icicle layer. 2. On the injuries of the certain kinds of crops.** [Japanese] *Proc. Crop. Sci. Soc. Japan* 1953, **22,** No. 1-2, 9-12, bibl. 8, illus., English summaries pp. 10 and 12. [Kanto-Tosan Agric. Exp. Sta.]

The heaving of frozen soil and subsequent damage to plants are described and discussed. The heaving process itself is attributed to the formation of a layer of pure ice at a distance below the soil surface. The fracture or partial fracture of the roots of lucerne, sweet-clover, red clover, hairy vetch, cocksfoot, timothy, rye and rape caused by the heaving of the frozen soil is described. The susceptibility of the plant roots to damage depended upon the structure of the root system of the particular species and the degree of root development at the time of freezing. The root systems of red clover, lucerne and sweet-clover were fractured and divided horizontally into 2 parts about 10 cm. below the soil surface : as a result lucerne and sweet-clover plants occasionally fell and died. The branch roots, but not the main roots, of hairy vetch and rye were severed by frost-heaving. In the case of cocksfoot and timothy plants the root system was only fractured at its periphery. The roots of rape were scarcely damaged. —W.J.B.

1045† Cooke, A. R. **The relation of plant growth hormones to photoperiodism.** *Diss. Abstr.* 1953, **13,** No. 5, 641-2. [Univ. Michigan, USA]

" It may be concluded . . . that flower initiation in both long-day and short-day plants is associated with a decrease in auxin content. However, this decrease in auxin is not in itself the cause of flower initiation, as lowering the auxin content of the plant by various methods has not brought about flower initiation under unfavourable photoperiods."

1046† Bocchi, Ada. Ulteriori osservazioni sul l'azione dell'eosina. Effetti sulle correlazioni fra le diverse gemme di piante erbacee. [**Further observations on the action of eosin. Effects on the correlations among the different buds of herbaceous plants.**] *Ateneo parmense* 1953, **24,** No.3-4, pp. 4, bibl. 2. [Ist. Bot. Univ. Parma, Italy]

Plants of *Perilla ocymoides* var. *nankinensis*, sprayed with aqueous solutions of eosin at concentrations of 0·001 to 0·005%, showed an increase in lateral branching, compared with untreated controls. The combined treatment with eosin and β-indole acetic acid produced no abnormal branching. [See also Abs. 675.]—E.B.O.

1047 Preston, W. H. and others. **Movement of**

**alpha-methoxyphenylacetic acid from one plant to another through their root systems.** *Science* 1954, **119,** No. 3092, 437-8, bibl. 3. [Hort. Crops Res. Branch, U.S. Dep. Agric.]

Alpha methoxyphenylacetic acid (MOPA) is reported to have marked growth-modifying properties. The results of a number of experiments made to study the movement of MOPA from the root system of one plant to that of another are reported. Where two bean plants were grown in the same pot, with the stems 0·5 in. apart, MOPA applied to one plant at a rate of 100$\mu$g. in a narrow band round the stem, moved from the treated to the untreated plant in detectable amounts within 9 hr. It was shown that MOPA could not have been transferred in the form of vapour, but was transferred in a chemically unchanged form. It was considered likely that transfer occurred through water films between the roots of treated and untreated plants. In trials with a number of other growth-modifying substances, in no case did transfer from treated to untreated plants occur. Experiments were made to determine whether transfer of MOPA would take place between different crop species. The results showed that transfer occurred from bean plants to sunflower, buckwheat [*Fagopyrum esculentum*] and cotton, and from each of these species back to beans. MOPA did not move from maize to any other species.—P.J.B.

1048 HEWITT, E. J. **Metal interrelationships in plant nutrition. 2. The relation of metal toxicity, molybdenum and nitrogen source to chlorophyll and magnesium content of beet in sand culture.** *J. exp. Bot.* 1954, **5,** No. 13, 110-18, bibl. 15. [Long Ashton Res. Sta., Univ. Bristol]

1049† DIBLE, W. T. **Boron determination in soils and plants. Simplified curcumin procedure.** *Anal. Chem.* 1954, **26,** No. 2, 418-21, bibl. 14. [Univ. Wisconsin, Madison]

1050† JOHNSON, C. M. and ARKLEY, T. H. **Determination of molybdenum in plant tissues.** *Anal. Chem.* 1954, **26,** No. 3, 572-4, bibl. 4. [Pl. Nutr. Dep., Univ. California, Berkeley]

Details are given of a modification of the thiocyanate-stannous chloride method of determining the Mo content of plant tissues. Advantages claimed include: improved sensitivity, accuracy and ease of manipulation.—P.J.B.

1051† LECOMTE, R. and SEILLEUR, P. Extraction des carotènes en vue de leur détermination. [**The extraction of carotenes for determination purposes.**] *Bull. Inst. agron. Gembl.* 1953, **21,** No. 3-4, 14-25, bibl. 5.

1052 FRIED, M. **The feeding power of plants for phosphates.** *Proc. Amer. Soc. Soil Sci.* 1953, **17,** No. 4, 357-8, bibl. 4. [Soil and Pl. Relationships Div., Pl. Industry, Bur., U.S. Dep. Agric., Beltsville, Md]

Studies were made to determine the relative uptake of P by a number of grass, cereal and legume species, where the factors of size and extent of the root absorbing surfaces of the plants were eliminated. Rock phosphate and monocalcium phosphate, containing $P^{32}$, were used as the sources of P. P in monocalcium phosphate was equally available to all species tested, including barley, buckwheat [*Fagopyrum esculentum*], beet (except in one trial), lucerne, and oats. There were definite differences between plant species in their ability to utilize rock phosphate. The percentage of P in the plants derived from rock phosphate was greatest for buckwheat, followed, in order, by lucerne, crotalaria [*Crotalaria spectabilis*], oats, beet and perennial ryegrass [*Lolium perenne*].—P.J.B.

1053 CAPÓ, B. G. and SAMUELS, G. **The development of a mathematical concept to interpret the relation between plant composition and crop yield.** *J. agric. Univ. P.R.* 1953, **37,** No. 4, 249-64, bibl. 16.

From data taken from determinations of the yields and nutrient content of Hegari sorghum plants, grown in pots on 28 Puerto Rican soils receiving 3 different manurial treatments, the following general equation was deduced to relate sorghum yields to the nutrient composition of the plants: Yr = A + B arc tan percent Nu. Yr represents the relative yield of the crop, A and B are constants, and arc tan percent Nu is the arc whose tangent is the percentage of the respective nutrient in the plant on a dry-matter basis. Relative yield was defined as the percentage that actual yields were of those obtained where the heaviest amounts of given nutrients were applied to the growth medium. The equation appeared to hold good for N, P. and K.—P.J.B.

## MISCELLANEOUS

1054 HARRIS, W. V. **Termites and tropical agriculture.** *Trop. Agric.* 1954, **31,** No. 1, 11-18, bibl. 4.

The influence of termites on agricultural practices is considered under 3 heads: destruction of buildings, damage to crops and influence on soil fertility.

Various types of termite are classified according to habitat and diet. The activities of certain termites which are pests of crops are described. In parts of Tanganyika and Nyasaland a harvester termite, *Hodotermes mossambicus* damages seedling cotton. *Microtermes thoracalis* attacks the roots of young cotton in the Gezira irrigation area, Sudan. Cases of cotton wilt in adult plants caused by stem-boring on the part of *Microtermes*, *Amitermes* and *Microcerotermes* are reported from Africa. Subterranean termites attacked groundnuts (pods), sunflower and maize in Tanganyika. Certain types of harvester termite feed on pastures in the drier parts of the tropics. Plants continually chafed at soil level as a result of wind action are especially liable to termite damage. Termites feed on fresh green-manures as well as on living plants. They appear to be less active on humus-rich than on humus-deficient soil. Soil fumigants such as BHC can be used for the control of termites.—W.J.B.

1055 † SAALTINK, G. J. and TICHELER, J. De bestrijding van ritnaalden. [**The control of wireworms.**] *LandbVoorl.* 1954, **11,** No. 2, 79-87. [Pl. Path. Serv., Wageningen]

As a result of investigations since 1952 into the control of wireworms in maize and spring oats by the application of BHC, Lindane and Aldrin to the soil and Lindane and Aldrin to the seed, the following recommendations are made: (a) for maize, 3 g. of 20% Lindane per kg. seed should be applied to the seed; (b) for other cereals such as oats (the experiment was carried out on spring oats), 2-3 g. 20% Lindane per kg. of seed should be applied to the seed; (c) for sugar- and fodder-beet, 5 g. 20% Lindane per kg. of seed is now considered sufficient (10 g. 20% Lindane per kg. of seed was previously recommended). From the results of the experiments it appeared that 20% Aldrin applied to oat seed at the rate of 4 g. per kg. and 5% BHC applied to the soil at 100 kg. per ha. would protect oat crops from wireworms as effectively as the recommended dose of Lindane. In an experiment with maize, in which various soil and seed treatments were compared on wireworm-infested soil, the recommended seed-treatment with Lindane gave excellent control of wireworm but the highest surviving plant-population was obtained where 0·7 % Lindane was applied to the soil at the rate of 70 per kg. ha.—W.J.B.

1056 ROBINSON, P. and GLOVER, J. **The reliability of rainfall within the growing season.** *E. Afr. agric. J.* 1954, **19,** No. 3, 137-9. [E. Afr. Agric. For. Res. Org.]

The distribution of the rainfall over the season is important and a method is explained for measuring the reliability of any selected suitable distribution of rain, month by month, within the season. A worked example is given. [See also *Fld Crop Abstr.* 7 : 687.]—C.L.S.

1057 MCKENZIE, M. G. and others. **Measured crop performance 1952.** *Bull. 381. N. Carolina agric. Exp. Sta.* 1953, pp. 40, illus.

Data are given of yield and other characteristics of maize, cotton, oats, barley and wheat varieties grown at different locations in N. Carolina. Brief notes are given on the most important of these varieties. Varieties are recommended.—P.J.B.

1058 † PENDLETON, R. L. **Agricultural education and research in south-east Asia. Jottings from a note book of a soil scientist.** *Malay. J. trop. Geogr.* 1953, **1,** 49-56.

Problems of agricultural education in south-east Asia are discussed with special reference to Siam and the Philippines.—W.J.B.

1059 † JAHTENFELJD, P. A. [**125 years of agricultural research in Siberia.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 1, 77-9, illus.

1060 CANADA. National Research Council. **Publications of the National Research Council of Canada. 1918-52, with supplement 1953.** 3rd edn, 1953, pp. 263.

1061 † PEARSALL, W. H. **Science in East Africa.** *J. Inst. Biol., Lond.* 1954, **1,** No. 2, 13-15.

The chief problems facing scientists in Kenya, Tanganyika and Uganda are outlined. The main objects of research are to combat human, animal and plant diseases, to increase food supplies from developed agricultural lands and to find means of developing swamp and dry lands.—W.J.B.

1062 † LUYTJES, A. Agrarische politiek in Brits Oost-Afrika. [**Agrarian policy in British East Africa.**] *Landbouwk. Tijdschr., Wageningen* 1954, **66,** No. 2, 69-89, illus., English summary p. 89. [Roy. Trop. Inst., Amsterdam]

1063 † FISHER, F. J. F. **A humidity-control system for air-conditioned cabinets.** *N.Z. J. Sci. Technol.* 1953, **35,** No. 3, 279-83, illus. [Bot. Dep., Univ. Otago, N.Z.]

## BOOKS AND REPORTS

### BOOKS

1064 WHITEHEAD, T., MCINTOSH, T. P. and FINDLAY, W. M. **The potato in health and disease.** 3rd edn, 1953, pp. xv + 744, bibl. approx. 1000, illus., London and Edinburgh; Oliver and Boyd, 22 × 14 cm., 60s.

This excellent treatise on all aspects of the potato is now in its third edition, having been first published in 1927. There is an impressive list of references to literature and a very good combined subject-author index.—C. L. Skidmore.

1065 Pynaert, L. Le manioc. [**Cassava.**] 2nd edn, 1951, pp. 166, bibl. 35, illus., Bruxelles; Minist. Colon., Dir. Agric., 24 × 16 cm., 40 fr. [Received 1954]

This monograph on cassava (*Manihot utilissima*) is concerned with: history; types and varieties; climate and soil requirements; cultivation; planting; cultural methods; manuring; propagation; crop rotation; harvesting; yield; diseases and pests; uses; chemical composition and presence of hydrocyanic acid in the roots. The information given, especially on varieties and yields, covers the following countries: East Africa, French Equatorial Africa, Ivory Coast, Dahomey, Togoland, Cameroons, Belgian Congo, Madagascar, Indo-China and Indonesia. An account is also given of research on cassava carried out mainly at the Alaotra Station, Madagascar, in Indonesia and the Belgian Congo.—E. Biasutti Owen.

1066 Krasniansky, V. and Coulonvaux, P. L'arachide au Congo belge. [**The groundnut in the Belgian Congo.**] 1953, pp. 103, bibl. 15, illus., Bruxelles; Minist. Colon., Dir. Agric., 24 × 16 cm., 30 fr.

This monograph on the groundnut (*Arachis hypogaea*) is concerned with: classification of sub-species and botanical varieties; root development; flowering; fructification; selection; introduction of selected varieties into the native farming of the Belgian Congo; geographical distribution; soil and climatic requirements; cultivation in the Belgian Congo, including crop rotations, sowing, harvesting, drying, diseases, pests, yields; chemical composition of the seed; uses; groundnut trade in the Belgian Congo. Although a small-scale experiment on the mechanized cultivation of groundnuts was started at Kwango in 1947 from which limited conclusions were drawn, groundnut cultivation in the Belgian Congo is still in the hands of the natives who employ primitive methods. Information is also given on the British East African groundnut scheme for mechanized cultivation of the crops and on the French plan for groundnut cultivation in Senegal.—E. Biasutti Owen.

1067 Huelsen, W. A. **Sweet corn.** 1954, pp. xv + 409, bibl. in text, illus., London and New York; Intersci. Publ., Ltd., 22 × 14 cm., 58s. or $10·50.

Professor Huelsen has set out to write a definitive book on sweet-corn, a crop on which no full-dress mongraph seems to have appeared before. As with other volumes in this series, both the cultivation of the crop and its processing by the canners are covered, but the latter aspect occupies four chapters only out of a total of fourteen.

The treatment of the crop is certainly comprehensive, covering its history, botany, genetics, ecology, processing, nutritional value, and production statistics. The attempt to isolate this particular kind of maize for scientific literary treatment is not wholly successful, since on some of the points dealt with there are few or no experimental data on sweet-corn, and, in consequence, data from field-corn (maize) are used—which may lead to duplication if a subsequent volume in this series should deal with the field-corn crop. Sweet-corn differs from field-corn in a number of ways. The bulk of the crop is now planted from single-cross hybrids, whereas in field-corn double or three-way crosses are used. Nutritionally, sweet-corn contains more protein and more niacin (of which it is one of the best vegetable sources) than field-corn, and more fat than the dent-corns.

One problem which will interest British maize growers, the cold and disease resistance of maize seed during germination, is fairly fully treated. The experimental work described appears to pay inadequate attention to the control of soil moisture if the cold test is to mean anything, a point which has recently been shown to be of importance by Harper in Britain. [See Abs. 807.] Sweet-corn seed is outstanding amongst other maizes in its capacity for water absorption.

The subject-matter of the book is entirely confined to the United States; the lengthy bibliographies at the end of each chapter contain very few references to foreign literature and still fewer in any language but English. This is not surprising since, as the author states, sweet-corn has "never become popular except in the United States and Canada, and to some extent in Argentina and Australia." In the United States, the location of the crop has been gradually shifting towards the northern limits of the maize belt, and this tendency has been accentuated since, beginning in the nineteen-twenties, the canners have changed the bulk of their production from white corn to yellow corn, based mainly on the variety Golden Bantam and its hybrids. In 1953, the acreage of sweet-corn grown for processing reached over 500,000. From 80 to 85 per cent of sweet-corn grown for seed is produced in south-western Idaho. In Canada about 40,000 acres were grown in 1947, the last year for which the author quotes figures. In Argentina, production for canning is limited, and seems to be confined to white-grained hybrids. In Australia, production has declined to negligible proportions after a temporary war-time expansion when American troops were stationed there. It does not look as if the crop were likely to have much future in the tropics, since its tendency in the United States has been towards the higher latitudes.

Hot seasons reduce the sugar-content of the grain, which also decreases after picking much more rapidly at high than at moderate temperatures.

As a study in technical attention to a crop, the book makes fascinating reading. The Americans have not got where they are with maize hybrids without an immense amount of work over a longer period than is generally realized. It appears that hybridization of maize varieties was begun as early as 1889; and it was already noticed in 1891 that the advantages of the first cross included not only high yield but uniformity—a very important point with sweet-corn for canning. With the good performance of the modern hybrids it is, as the author points out, surprising that the national average yield of sweet-corn has not risen more than it has. Over the ten-year period 1918-27 the average yield per acre was 2·28 tons, and for 1943-52 it was 2·54 tons.—G. B. Masefield.

1068 BRIXHE, A. Le coton au Congo belge. [**Cotton in the Belgian Congo.**] 2nd edn, 1953, pp. 118, bibl. 61, illus., map, Bruxelles; Minist. Colon., Dir. Agric., 24 × 16 cm., 60 fr.

This book, which expands on the information given by the author in a previous article [see *Fld Crop Abstr.* 4 : 781], reviews the various aspects of cotton cultivation in the Belgian Congo, including historical development, culture, research, transport, storage, processing and trade. The production of seed cotton was 162,000 tons in 1952. As to the varieties grown [see also *Fld Crop Abstr.* 4 : 784], Gar (U4 × Triumph) has replaced Triumph in the southern region. Other successful varieties mentioned are 14/125 and 4-10.—E. Biasutti Owen.

1069 ADRIAENS, E. L. Les oléagineux du Congo belge. [**The oil plants of the Belgian Congo.**] 2nd edn, 1951, pp. 321, bibl. in text, illus., Bruxelles; Minist. Colon., Dir. Agric., 24 × 16 cm., 100 fr. [Received 1954]

This work reviews about 600 plant species (herbs, shrubs and trees), either indigenous or introduced into the Belgian Congo, including the principal oil-yielding plants and others which are of secondary interest for oil production. Some of the plants considered, such as several species of the Gramineae (maize, rice, sorghum, forage grasses, etc.) are studied from the standpoint of their oil content. The species are arranged following their botanical classification. Scientific, as well as economic, information is given on the species considered, and the chemical composition of their seeds, oil and cake is given. Vernacular names are included. There is an index of botanical names, and also summary tables in which the species are grouped according to their capacity for yielding industrial or edible oils, and drying or non-drying oils.—E. Biasutti Owen.

1070 ANDREWS, F. W. **Vernacular names of plants as described in "Flowering plants of the Anglo-Egyptian Sudan Vol. II."** 1953, pp. 89, Sudan; McCorquodale and Co., Ltd., 22 × 15 cm.

The families described in Vol. II (see title) are the Sterculiaceae to Dipsacaceae. In the present booklet, the vernacular names of plants in this series of families are arranged alphabetically; the language used and the botanical names are also given. [See also *Herb. Abstr.* 23 : 986 and 20 : 1410.]—D. Brown.

1071 HORNE, F. R. **Crop production. A series of lectures delivered during the 1952-3 session under the Devon County Agricultural Association lectureship.** *Seale Hayne agric. Coll.* 1953, pp. 73, bibl. 91, 4s.

This review of the principal farm crops in Great Britain provides an excellent and readable summary of the results of agricultural crop research over the years and is supported by a valuable bibliography. Despite the slim appearance of this booklet, it contains a wealth of up-to-date facts and findings and should be read by all those concerned with improving crop production in this country.—C. L. Skidmore.

1072 KLAPP, E. Lehrbuch des Acker- und Pflanzenbaues. [**A text book of soil- and crop-cultivation.**] 1954, 4th edn, pp. viii + 407, illus. 192, Berlin; Paul-Parey, 23 × 15 cm., D.M. 25.

The contents of this, the fourth, edition of "Acker- und Pflanzenbau" are substantially the same as the second, published in 1944 [see *Herb. Abstr.* 17 : 1481]. This edition, however, is more pleasingly produced as regards paper, cover and illustrations; the illustrations are also more numerous. The work is in two parts. The first sets forth the climate and soil of crop plants (with special reference to agriculture in Germany), manuring, rotations, soil cultivation, sowing and crop husbandry. This part has undergone but little change. There are modifications, such as an occasional rewording or rearrangement of the text, an omission here, or a further development there. Perhaps the most marked revision is in the section which deals with soil types, a section further improved by the coloured plate illustrating the principal soil types in Germany. The second part of the book is a useful reference work on the most important field- and forage-crops of Germany. These are grouped in the usual way: cereals, leguminous crops, oil-bearing crops, tuber and root crops, leaf crops, fibre crops and forage crops (legumes, grasses and their mixtures). The information on each crop is presented under all, or some, of the following headings: origin, migration, botanical characters, requirements of soil and climate, its place in a rotation, nutrient requirements and manuring, sowing and problems connected therewith, husbandry, injury, pests or diseases to which the crop is subject, maturing of the crop and harvesting. Some crops, e.g. lentils, garden beans and Jerusalem artichoke, have been omitted from this edition while others, e.g. sweet-clover, have been added. The portion on the potato has been extended while the treatment of poppy and mustard has been curtailed.—D. Brown.

1073 KÖHNLEIN, J. and VETTER, H. Ernterückstände und Worzelbild. Menge und Nahrstoffgehalt der auf dem Acker verbleibenden Reste der wichtigsten Kulturpflanzen. [**Crop residues and root structure. The quantity and nutrient content of the plant residues left in the field after harvesting crops of the important cultivated plants.**] 1953, pp. 138, bibl. 101, illus., Hamburg; Paul Parey, 25 × 17 cm., D.M. 22·40.

1074† VERONA, O. Malattie nutrizionali delle piante coltivate. [**Nutritional diseases of cultivated plants.**] 3rd edn, 1953, pp. 207, bibl. in text, illus., Bologna; Edizioni Agric., 21 × 13 cm., 1300 Ital. lire. [Ist. Pat. Veg., Univ. Pisa, Italy]

This is a concise review of a wide literature on the diseases of plants caused by a deficiency, or an excess, of mineral elements in the soil. The role played by various elements in the life of different crops is examined. Many tables are given including those showing the percentages of the various elements found in different plants. Besides the principal plant nutrients all the micro-nutrients appear to be included. There are numerous illustrations, some of them coloured. There is a subject and an author index, but the long bibliography given in the first edition has been omitted from the present one.—E. Biasutti Owen.

1075† SUHORUKOV, K. T. [**Physiology of immunity in plants.**] [Russian] 1952, pp. 146, bibl. 267, Moscow; USSR Acad. Sci., 22 × 15 cm. [Received May, 1954]

The subject is discussed in 8 chapters which include: exosmosis and immunity; ferments and immunity; necrosis of plant cells; metabolism of the plant and of the parasite in relation to plant resistance; the plant's supplementary nutrients necessary for the parasites; and the laws of passive and active immunity in plants.—M. Hall.

1076† ARNON, D. I. [Ed.] **Annual review of plant physiology. Vol. 4.** 1953, pp. 453, California; Annual Reviews, Inc., 23 × 14 cm., $6.

Among contributions noted are:

1. Nitrogen metabolism of higher plants. By J. G. Wood, pp. 1-22, bibl. 149.
2. The use of respiratory inhibitors. By W. O. James, pp. 59-90, bibl. 247.
3. Organic acids in plant metabolism. By R. H. Burris, pp. 91-114, bibl. 147.
4. The relation of chemical structure to biological activity in growth substances. By H. Veldstra, pp. 151-98, bibl. 190.
5. Physiology of root growth. By H. Burström, pp. 237-52, bibl. 83.
6. Herbicides. By A. S. Crafts, pp. 253-82, bibl. 249.
7. The effect of temperature on plant growth. By F. W. Went, pp. 347-62, bibl. 157.—P.J.B.

1077† MAKSIMOV, N. A. [**Collection of works on drought- and frost-resistance in plants. Part 2. Frost-resistance in plants.**] [Russian] 1952, pp. 294, bibl. approx. 260 (not numbered), illus. Moscow; USSR Academy of Sciences, 26 × 17 cm. [Received May, 1954]

The papers cover the period from 1913 onwards.—M.H.

1078† JACKS, G. V. **Soil.** 1954, pp. ix + 221, bibl. 60, illus., Edinburgh; Thomas Nelson and Sons, Ltd., 20 × 13 cm., 12s. 6d.

In this book the author has succeeded in writing a modern elementary book which is different. He defines soils as " what plants grow in " and briefly describes the many facets of soil science. Soil texture and structure, soil forming processes, as well as the chemistry, biology and classification of soils are all explained simply, without assuming that the reader has much knowledge of the appropriate sciences. The author stresses the importance of soil structure and describes how it can be created and destroyed. The consequences of good structure and of deterioration in structure are both dealt with in considerable detail. There is a chapter devoted entirely to forest soils and the author frequently draws attention to the differences between agricultural soils and those occurring under natural vegetation. The effects of man's activities are well described, especially in the chapter on erosion and in the last chapter on the history of British soils which deals with the influence of social and economic events on the transition from a forest soil to an agricultural soil.

The text is illustrated by photographs as well as diagrams and maps, including six very well-reproduced colour photographs of soil profiles. There are a number of mistakes, some of which may cause confusion, but these will not prevent the book being useful, especially to those who want a short account of present-day ideas.

The author states that the book is intended to give farmers and students of agriculture an insight into the science of soil management. Many of these readers may be disappointed in the theoretical discussion and the book might have been improved for them if some parts had been given a more practical bias. In places the phraseology is "popular" but the diction is mainly scientific and this may deter many for whom the book would be useful. A more serious criticism is that there are few suggestions for further reading and many of the references will be inaccessible to the lay reader [one-fifth are published in foreign-language journals]. Other references might have been chosen which would have been more suitable for an elementary book.—W. E. Chambers.

## REPORTS

*The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.*

1079 **Netherlands.** Nationaal Comité voor Brouwgerst. 18de Jaarboekje, 1954. [18th yearbook of the National Committee for Malting Barley, 1954.] Rotterdam, 1954, pp. 139, illus., English index p. 139.

INVESTIGATIONS REPORTED :

1. Growing spring barley on land flooded by sea-water. By A. de Regt, pp. 86-97. [See Abs. 786.]
2. Field trials with spring barley in the south-western clay region in 1953. By W. Wilten and A. Th. Kortenhorst, pp. 103-13. Varietal trials, with Balder as standard, are reported. There was little difference between the yields of Balder, Frisia, Herta, Piroline and Agio. The varieties Proctor and Carlsberg were included in one trial only ; the former equalled Balder in yield and the latter outyielded Balder by 5%. The malting quality of the varieties was also tested.
3. Yields, statistics and characters of barley varieties. By W. Wilton, pp. 114-27. Statistics on the yields, acreages grown and other characteristics of malting and fodder barley grown in the Netherlands in 1953 are presented and analysed.—W.J.B.

1080 **Netherlands.** Commissie ter Bevordering der Suikerbietenteelt in de Noordelijken Provinciën. Rapport over 1952. [Report for the year 1952 of the Society for the Promotion of the Cultivation of Sugar-Beet in the Northern Provinces.] *Meded. Inst. rat. Suikerprod.* 1953, **23,** No. 183, 185-250.

INVESTIGATIONS REPORTED :

1. Plant population, pp. 189-94. As in 1951 [See *Fld Crop Abstr.* 6 : 830] the best yields of roots, tops and sugar were obtained where the stand numbered 75,000 plants per ha. A reduction of the plant population from 75,000 to 45,000 caused reductions in sugar yields of 1270 and 840 kg. per ha. in the case of the varieties Kuhn P and Klein Wanzleben E, respectively. Distances between rows of 40 cm. gave better yields than distances of 50 cm.
2. The effect on sugar content as a result of leaving lifted, untopped beet in the field for a period of 1-5 weeks before harvesting, pp. 200-2. [See Abs. 889.]
3. Trials of methods of cultivation and sowing, pp. 210-33.Seeds were sown with a normal seed-drill using unpolished seed and with a precision seed-drill using polished seed on soil cultivated to depths of 12 and 6 cm. Unpolished seed germinated earlier than polished seed. Germination was more regular and plant populations greater on shallow-cultivated than on deep-cultivated plots. The plant population per ha. after singling on shallow cultivated plots was about 76 thousand on plots sown with unpolished seed and about 69 thousand on plots sown by precision drill with polished seed. The use of the precision drill saved about 14 man-hours per ha. in singling.—W.J.B.

1081 **Basutoland** Department of Agriculture. Annual report. 1953, pp. 63, illus.

A 50 : 50 mixture of superphosphate and raw Moroccan rock phosphate, giving 25% total $P_2O_5$, when applied at the rate of 200 lb./ac. doubled or more than doubled the yield of maize and of sorghum at most of the trial centres (11 and 9 stations, respectively).—C.L.S.

1082 **Belgian Congo.** Kiyaka Station. L'activité de la Station. [The work of the Kiyaka Station.] By R. Hardy. *Bull. Inform. INÉAC* 1954, **3,** No. 1, 1-36, illus.

INVESTIGATIONS REPORTED :

1. Maize, pp. 7-12. The local variety Kahila yielded consistently more than other varieties tested, and was followed by Masangu ya Mpembe. The best spacing on the plateau was 1 × 1m.
2. Groundnuts, pp. 16-19. The varieties A 20 and A 28 yielded best. Sowing depths of 3-4 cm. gave consistently better results than 6 and 9 cm.
3. Soyabeans, pp. 19-20. The varieties K/92/6/2/2/3 and Java 3334 yielded best in 1952, in both first and second crops. The spacing of 0·40 × 0·30 m. with 2 seeds per hole was adopted at the station.
4. Yam [*Dioscorea* sp.], pp. 20-1. The varieties S.C. 014, S.C. 047, Kusu, Mutebo and Idingo, grown at the spacing of 1 × 1 m. and harvested after 11 months growth, yielded best.
5. Crop rotation trials, pp. 29-31. In the valley, the rotation groundnuts/maize/cassava gave the best crop yields as a whole. Although on the plateau the yield of all the crops tested was low, the succession cassava + gourd/a graminaceous crop (maize or millet) was advantageous, while the succession cassava + gourd/a legume (groundnuts or *Voandzeia subterranea*) was unsuitable.—E.B.O.

1083 **Angola.** Cunene Experiment Station. Posto de ensaios do Cunene. Relatório técnico do ano de 1952. [Pioneer experimental station in the Cunene Valley, Angola. Technical report for 1952.] By J. H. M. Mirrado. *Agron. Angol.* 1953, No. 8, 95-149.

Work at the Cunene Station began in 1950 and reports for 1950 and 1951 are also published in the same issue of the journal. The object of the experiments is to obtain data which will assist the development of the region by Portuguese colonists. Details of the climate and soil-types at the station are given. Irrigation was used for most crops. Among those successfully grown were wheat, maize, sunflower, potatoes, sweet potatoes for fodder, linseed and kenaf.—W.J.B.

1084 † **South Africa.** Tugela Basin. A regional survey of the catchment area of the Tugela River and its tributaries. Interim Report produced by the Town and Regional Planning Commission for the Natal Provincial Administration and the Natural Resources Development Council. 1953, pp. 143, bibl. in text, illus., maps.

This interim report is a valuable contribution to regional planning in South Africa. It also serves as a comprehensive handbook to this region of 11,000 square miles to the north-west of Durban in the high-rainfall area of the Union of South Africa. The report includes chapters on climate, vegetation, agriculture, forestry, water resources, soil conservation and reclamation, population and labour resources.—A.G.G.H.

1085 **New Zealand** Department of Scientific and Industrial Research. 27th Annual Report. Wellington, 1953, pp. 107.

[See also *Fld Crop Abstr.* 6 : 1202.]

Varietal trials, various crops, pp. 24-7. An oat variety has proved resistant to lodging, and, if acceptable to the millers, it will be released under its English name, Milford. A new project has been started to discover varieties of linen flax more resistant to lodging than the types grown at present. The varieties Hollandia and Percello are promising.

Wheat research, pp. 88-90.—M.H.

1086 **United States.** Purdue University Agricultural Experiment Station. Progress of agricultural research in Indiana. 66th Annual Report of the Director for the year ending June 30th, 1953. pp. 148.

INVESTIGATIONS REPORTED :

1. Knox, a new, soft, red, winter wheat. By R. M. Caldwell and others, pp. 9-11. In standard trials in Indiana, Knox, a short-strawed, early variety, considerably outyielded Vigo, Seneca and Fairfield during 1946-53. Knox is resistant to leaf rust and to mosaic virus disease.
2. Commercial and inbred sweet-corn. By G. M. Smith, p. 11. A vew variety, Golden Harvest, was released to growers in 1952. It is similar to Golden Cross Bantam, but has colourless silks inside the husks.
3. Oat breeding. By R. M. Caldwell and others, pp. 12-13. A new variety of winter oat, Dubois, was released late in 1952. It has very stiff straw and is considerably more winter-hardy than the standard variety Forkedeer. A note is given on Clintland, a variety resistant to crown rust.
4. Herbicidal trials. By O. C. Lee, pp. 27-30. Ten lb. DNOSBP per ac. applied to soyabeans just before emergence gave good control of broad-leaved and grass weeds, without reducing yields. Ten lb. CIPC per ac. was effective for controlling early-growing grasses and *Polygonum* spp. Spring applications of 3 lb. 2,4-D per ac. partly eradicated wild garlic (*Allium vineale*) and limited the production of its bulbs.
5. Physiology of fruiting in plants. By A. C. Leopold and others, p. 102. Studies with a number of crops, including wheat, soyabeans, maize, barley, oats and peas showed that auxin treatment of seeds or plants, followed by a short exposure to low temperatures, under certain conditions resulted in a large increase in earliness of flowering. Dormancy in potatoes and failure to germinate in oats were thought to be related to enzyme inhibitors inhibiting sulphydril enzymes : British Anti-Lewisite (a poison gas antitoxin) could be used to break potato dormancy.
6. Experiments on developmental physiology of winter wheats. By G. A. Gries and others, p. 103. There was evidence that soaking seed of winter wheat in naphthalene acetic acid could affect the developmental rate of the plants.—P.J.B.

1087 **United States.** Seed improvement. A report on a visit to the United States of America under the auspices of the Mutual Security Agency [now known as the Foreign Operations Administration] 24 June to 17 August, 1953. By G. W. G. Briggs. pp. 43, mimeo. [Nat. Inst. Agric. Bot., Cambridge, England]

A report is made on the following :

1. Organization of agricultural services, p. 2.
2. Plant breeding, pp. 3-6. The volume of material used in breeding work was a striking feature.
3. Methods of breeding, pp. 6-8 and Appendix 3. Investigations into the use of maize plants characterized by cytoplasmic male sterility, to eliminate the necessity for detasselling in the production of commercial maize seed, are described.
4. Determinations of recommended varieties, pp. 9-11. Varieties not recommended as well as those recommended appear in the annual descriptive lists of varieties published by the State Extension Services. In some cases, recommended varieties

for a particular State are further classified as adapted for certain regions of that State. The Department of Agriculture is responsible for adaptation tests in various States of plant varieties imported from abroad.

5. Multiplication of seed stocks, pp. 11-14. The close co-ordination between plant breeding institutions and commercial organizations representing farmers and seeds merchants is illustrated. For example, the Agronomy Seed Stocks Department of Minnesota University multiplies breeder's seed to give foundation seed which is then made available to the Minnesota Crop Improvement Association for further multiplication to the registered-seed and certified-seed stages. Such Crop Improvement Associations are aided financially by the State and Federal governments.

6. Seed certification, pp. 14-17 and Appendix 4. Each State has its own regulations for seed certification, in many States responsibility is vested by law in the State Crop Improvement Associations. In all States the guidance of the International [USA and Canada] Crop Improvement Association, which establishes minimum standards, is accepted.

7. Marketing and storage of seeds, pp. 17-18. The system of contracts between grower and seed merchant used in Britain is little used in the USA. Foundation seed is sometimes stored, after drying to 10-12% moisture content, in cloth bags lined with water-proof paper.

8. Regulatory aspects of seed production, pp. 19-22. Both State and Federal laws provide for more detailed labelling of seed for sale than is the case in Britain.

9. Technical aspects of seed production, pp. 22-35. In sugar-beet seed production direct sowing was used and there was no transplanting of stecklings. Rows were 20-24 in. apart and there were 4-10 plants per foot of row. Heavy manuring and irrigation were used and average crops of 3500 lb. per ac. of sugar-beet seed were obtained. Harvesting of sugar-beet seed was by pick-up combine from the windrow.

10. The promotion of the wider use of improved seed, pp. 35-8. Advisory propaganda was carried out more intensively than in Britain. Some State agricultural colleges were equipped with radio transmission stations for the diffusion of agricultural advice.

11. Chemical herbicides in use in the USA and rates of application, Appendix 5.

12. Protecting pollinating insects from insecticides and herbicides. By H. A. Scullen, Appendix 6. In general, insecticides harmful to bees should be applied at times when the bees are not working on open blossoms, i.e. early morning or late evening. Among insecticides, lead arsenate is one of the most toxic to bees ; it should not be applied to blossoms frequented by bees. Other insecticides extremely toxic to bees are Parathion, tetraethylpyrophosphate, Dieldrin, Aldrin, Lindane, Chlordane, BHC and DDT. Insecticides relatively less toxic to bees are Toxaphene, DDD and Aramite. There are conflicting reports about the toxic effect of 2,4-D on bees.—W.J.B.

1088 **United States.** North-eastern Weed Control Conference. Proceedings of the 8th Annual Meeting. 1954, pp. 546 + supplement, pp. 75.

Among the papers read at this Conference were :

1. Studies on entry of 2,4-D into leaves. By R. L. Weintraub and others, pp. 5-10. [See Abs. 1026.]

2. The effect of soil organic-matter levels on several herbicides. By S. Dallyn, pp. 13-20. [See Abs. 818.]

3. Factors affecting the herbicidal action of dinitro-ortho-secondary-butyl-phenol. By W. F. Meggitt and others, pp. 21-2.

4. Response of 18 plant species to DPA (3,4-D), 2,4-D and MCPA. By J. R. Hansen and R. E. Ogle, pp. 29-31. [See Abs. 1029.]

5. Weeding sweet-corn with Premerge. By W. H. Lachman, pp. 95-6. [See Abs. 815.]

6. The effect of certain environmental factors on the response of sweet-corn to herbicides. By R. D. Sweet, pp. 97-105. [See Abs. 816.]

7. Experimental use of herbicides impregnated on clay granules for control of weeds in certain vegetable crops. By L. L. Danielson, pp. 119-26.

8. Weeding of cannery peas with herbicides. By C. J. Noll and M. L. Odland, pp. 127-30.

9. Weed control in peas with various herbicides. By E. R. Marshall and L. E. Curtis, pp. 131-5. [See Abs. 872.]

10. Effect of irrigation and cultivation on pre-emergence weed control of potatoes on Long Island. By J. H. Ellison and S. L. Dallyn, pp. 159-61. Premerge (alkanolamine salt of DNOSBP), Sinox General (DNOSAP + DNOSBP) and CMU, applied to potatoes at emergence, all gave adequate weed control for 3 weeks and saved 3 weedings and 2 cultivations. One inch of irrigation water applied after herbicidal treatment had no effect on weed control or potato growth.

11. Cultivation studies in potatoes. By R. J. Aldrich and others, pp. 163-5. [See Abs. 927.]

12. The effect of herbicides on potatoes used for chipping. By T. Eastwood and J. S. Cobb, pp. 167-75.

13. Chemical weed control in potatoes. By C. E. Cunningham and M. F. Trevett, pp. 177-82. [See Abs. 928.]

14. Pre-emergence weeding sweet-corn with 2,4-D, dinitro, and isopropyl trichlorobenzoic acid. By M. F. Trevett and others, pp. 193-201.

15. A comparison of various herbicides on sweet-corn grown under both irrigated and non-irrigated conditions in 1953. By A. H. Kates, pp. 203-8.

Premerge (DNOSBP) applied at 4·5 and 6 lb. per ac. at, or 3 days after, sowing, or at emergence, effectively controlled broad-leaved and grass weeds, with no injury to the sweet-corn. Dowicide G (Na pentachlorophenate) also gave very good results.
16. Progress report on agricultural uses of Dalapon. By L. Southwick, pp. 251-7.
17. Some factors involved in the chemical control of quackgrass. By R. A. Peters, pp. 257-64. [See Abs. 1016.]
18. A comparison of different herbicides applied at planting, at emergence, and at post-emergence on field-corn. By E. R. Marshall and G. Loeffler, pp. 265-72. [See Abs. 805.]
19. Effect of some chemicals on weed growth and maize production. By C. Veatch, pp. 273-81. A report is given of trials in West Virginia.
20. Field trials of planting applications of herbicides to maize. By L. E. Curtis and others, pp. 283-6. [See Abs. 806.]
21. The effect of a high and a low volatile ester of 2,4-D on 7 varieties of field maize as determined by injury and yield. By W. P. Anderson and others, pp. 289-92.
22. Chemical v. cultural control of weeds in soyabeans. By W. E. Chappell, pp. 301-6.

A supplement to these proceedings contains, in summarized form, details of measures about which there is general agreement for weed control in specific crops.—P.J.B.

# NEWS ITEMS AND NOTES

## France

1089 Revue Internationale de Botanique Appliquée. We regret to announce that this review comes to an end with the Nov.-Dec. issue, No. 373-4, of 1953. The review was founded and directed for 33 years by Prof. A. Chevalier, who was for many years corresponding editor for *Herbage Abstracts* and *Field Crop Abstracts*.—E.B.O.

## Netherlands

1090 A Training Course in Extension Methods was held at Wageningen University from 12 July-7 August, 1954. The course was arranged by the International Agricultural Study Centre and the Agricultural University of Wageningen in collaboration with F.A.O. *Neths J. agric. Sci.* February, 1954.—W.J.B.

## Africa

1091 Epidemics of a Central American Maize Rust. Epidemics of the Central American maize rust, *Puccinia polysora*, took place in the Ivory Coast, Gold Coast, Dahomey and Nigeria in 1950-52. [See Abs. 808.] The disease was first reported in Africa in 1949. By 1952-3, *P. polysora* had crossed to East Africa and is now established there. It is considered probable that the disease will eventually affect maize crops in Asia. At Ibadan, Nigeria, an attempt is being made to breed resistant strains of maize, using resistant types imported from Mexico and Venezuela. Dusting with sulphur gives a partial control of the disease. *World Crops* March, 1954.—W.J.B.

## Pakistan

1092 Scrub Land Reclamation. About 30 thousand acres of scrub land have been reclaimed in the Thal Desert, N.W. Punjab. Water from the Indus is used to irrigate the formerly uncultivated land. Sixteen thousand families living in 300 villages have been settled in the reclaimed area. The main crops are wheat, cotton, groundnuts and sugar-cane. The Thal Development Authority is responsible for the levelling and irrigation of the area, the planting of trees, the allocation of land to farmers in 15-acre lots, the building of villages, towns and roads and the development of industries. *New Commonw.* 13 May, 1954.—W.J.B.

1093 Mechanized Harvesting of Cotton. Two types of harvesters, the picker and the stripper, are produced in the USA. In 1952, 4771 pickers and 3511 strippers were manufactured. About one-fifth of the total cotton crop in the USA was harvested mechanically in 1952; the proportion of the crop harvested by machine in Texas, Arizona and California, respectively, was 22, 46 and 59%. *Emp. Cott. Gr. Rev.* April, 1954.—W.J.B.

# FIELD CROPS

## CEREALS

### WHEAT

1094 MENJŠENIN, F. [**Sowings of spring wheat on virgin soil and waste lands in the southern forest/steppe and steppe of the Čeljabinsk Province.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 3, 19-20.

In the southern Trans-Urals there are large areas of waste lands not yet utilized for agriculture. The region comprises a great reserve on which sowings can be extended. The tillage necessary for wheat sowings is described.—M.H.

1095 HILL, K. W. **Wheat yields and soil fertility on the Canadian Prairies after a half century of farming.** *Proc. Amer. Soc. Soil Sci.* 1954, **18,** No. 2, 182-4. [Fld Husb. Div., Canada Dep. Agric., Cent. Exp. Fm, Ottawa]

Yield trends of wheat over the past 40 years at the 3 Prairie Province Experimental Stations at Lethbridge, Alberta; Indian Head, Saskatchewan; and Brandon, Manitoba, are presented. Yields of wheat in a wheat/summer-fallow rotation, in which no manures were applied, have not declined. Continuous wheat yields have tended to decline very slightly, though this is thought to be largely due to increased weed infestation.—P.J.B.

1096 CHATTERS, R. M. and SCHLEHUBER, A. M. **A study of "frost-damaged" wheat in Oklahoma.** *Agron. J.* 1953, **45,** No. 10, 510-12, bibl. 3, illus. [Oklahoma Agric. Exp. Sta., Stillwater]

In Oklahoma in 1952, temperatures up to 90°F., followed by freezing temperatures, were experienced during the period 6-10 April. At this time, wheat was in the boot to heading stages of growth. Observations on damage to wheat plants caused by these extreme conditions were made. The greatest damage was caused in early-sown, or early-maturing, varieties. Some early varieties produced large numbers of secondary tillers, which caused wide variations in the maturity of heads at harvest. Head injuries were comparatively rare, and involved partial sterility and deformity. Stem injuries were the most characteristic form of damage observed, particularly on the lower parts. This was responsible for stem breakage and secondary invasion by fungi. Microscopic examination of cellular tissues showed marked changes in frost-damaged plants.—P.J.B.

097 GESLIN, H. and ROCHE, P. La récente période des gelées et ses conséquences sur les céréales. [**The recent period of frost and its effects on cereals.**] *C. R. Acad. Agric. Fr.* 1954, **40,** No. 5, 211-14, illus. [Sta. Cent. Bioclimat.]

A short account is given of the effect of the very cold spell in January and February, 1954, on winter wheat in various parts of France. Resowing was necessary only on limited areas where the shade temperature fell below −16°C. (without snow). Since the manifestations of damage were very diverse, it was thought that the plants had reached the limit of their resistance. In such circumstances the cultivation methods play a decisive role. It was noticed, for instance, that wheat sown below the normal depth of 2-3 cm., or at a high density, suffered greater injury than wheat sown at normal depth and density. In western France, it was frequently noticed that the wheat which suffered most damage was a crop which followed potatoes grown for seed, the tops having been destroyed by chlorate. The absence of rain during a cold spell is probably partly responsible for the final result.—D.B.

1098 DESAI, S. V. and others. **A lysimeter study of crop rotations. 1. Crop yields and soil productivity.** *Indian J. agric. Sci.* 1953, **23,** Pt. 4, 243-54, bibl. 10. [Indian Agric. Res. Inst., New Delhi]

The results are given up to the end of 1948 of an experiment begun in 1945 to determine the effect of different rotations on wheat yields and soil fertility. The following rotations were used: (a) berseem (with and without superphosphate)/cowpea (*Vigna catiang*)/wheat/cowpea; (b) wheat (either untreated with fertilizer or receiving N or P or both N and P)/*Eleusine coracana*/wheat/*Eleusine coracana*. The only fertilizers used were those applied to the first course in each rotation. The experiments were carried out in lysimeters using soil of a known chemical composition. The first crop of wheat in rotation (b) gave the highest yields of grain on the lysimeter where both N (80 lb. per ac.) and P (100 lb. $P_2O_5$ per ac. in 1945 and 200 lb. per ac. in 1947) were applied; wheat receiving P and K yielded 70% and 134% more grain than untreated wheat in 1945 and 1947, respectively. There were no significant effects from the fertilizer applications to the first wheat crop in rotation (b) on the subsequent crops. The application of 100 lb. per ac. $P_2O_5$ to berseem in rotation (a) more than doubled the yield of berseem fodder, but the yield of wheat was lower where P had been applied to the berseem than where it had not been applied. Where 200 lb. per ac. $P_2O_5$ were applied to the berseem, there was a beneficial effect of P on the yield of berseem fodder and on the yields of the succeeding cowpea and wheat crops. The yields of wheat grain in the third course of rotation (a), whether the berseem had received P or not, were significantly greater than those of wheat in the third course of rotation (b) even when the first wheat crop in the latter rotation had received both N and P.—W.J.B.

1099 DESAI, S. V. and others. **A lysimeter study of crop rotations. 2. The quality and chemical composition of crops.** *Indian J. agric. Sci.* 1953, **23,** Pt. 4, 255-68, bibl. 18. [Indian Agric. Res. Inst.]

The chemical composition of the crops grown in rotations (a) and (b) described in Abs. 1098 was determined and the quantities of plant nutrients removed by each crop from the soil were calculated. The 1000-grain weight and the protein content of the wheat grain were also recorded. The wheat in the third course of rotation (a) gave a greater total yield of N, P, K and Ca than the wheat in the third course of rotation (b). The protein content (14-18%) of the wheat grain following berseem and cowpea rotation (a) was higher than that of either first-course wheat grain receiving N and P directly (12-17% protein) or third-course wheat grain (11% protein) in rotation (b).—W.J.B.

1100 WAGNER, S. and ZWEIFEL, J. Untersuchungen über die Qualität der schweizerischen Weizenernte 1953. [**An enquiry into the quality of the Swiss wheat harvest in 1953.**] *Mitt. schweiz. Landw.* 1954, **2,** No. 6, 101-12, [Eidg. Landw. Versuchsanstalt Zürich-Oerlikon (S.W.) and Lausanne (J.Z.)]

1101 MELEŠKIN, A. [**Results of State varietal trials of wheat in Latvian SSR.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 4, 80-6.

Details are supplied of the numerous wheat varieties suitable for different zones in Latvia, and of cultural measures, sown areas and yields.—M.H.

1102 STAROV, M. V. [**Distribution of winter wheat varieties for crop rotations.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 2, 106-8.

1103 SEED WORLD. **New stem rust resistant wheat released for seed increase.** *Seed World* 1954, **74,** No. 10, 16.

Willet, a new variety of spring wheat, was produced from a Frontana × Thatcher cross. It is moderately resistant to Race 15B of stem rust [*Puccinia graminis tritici*] and has a high degree of resistance to other strains of stem rust. Willet is adapted to the corn-belt area of Minnesota and is a companion variety to Selkirk, a new Canadian variety, compared with which, it has better resistance to wheat scab [*Gibberella zeae*].—P.J.B.

1104 BLANCHARD, M. Contribution à la détermination des espèces et variétés de blés cultivées en Algérie par la réaction des grains, des epis et des pailles à l'acide phénique. [**Contribution to the determination of species and varieties of wheat cultivated in Algeria by the reaction of grain, ears and straw to phenol.**] *Proc. int. Seed Test. Ass.* 1953 **18,** No. 2, 161-6. [Sta. Cent. Essais Semences Amélior. Pl., Maison Carrée, Algiers]

Data are given of the results of trials with hard and soft varieties of Algerian wheat on the use of 1% solutions of phenol for distinguishing between varieties on the basis of colour reaction. The method used is applied to the grain, ears or straw and its procedure is described. From the results of these studies, it was apparent that from determinations made on the grain, 4 major varietal groups of Algerian soft wheats could be distinguished by their colour reaction and it was possible to distinguish between 2 groups of Mahon strains of soft wheat. Among hard wheats, 2 groups could be distinguished, the first made up of the variety Mekki and Adjini strains and the second consisting of 8 other strains.—P.J.B.

1105 NUTTONSON, M. Y. **Phenology and thermal environment as a means for a physiological classification of wheat varieties and for predicting maturity dates of wheat. Based on data of Czechoslovakia and of some thermally analogous areas of Czechoslovakia in the United States Pacific North-west.** [Publ.] *Amer. Inst. Crop. Ecol. 1953* pp. 108, bibl. 40, illus.

The studies reported were made : (a) to analyse existing data on wheat phenology in wheat-growing areas of Czechoslovakia and the USA with similar thermal and latitudinal environments, (b) to study the effect of certain of the major climatic factors, either separately, or when interacting, on wheat phenology, (c) to determine the number of days, temperature summations and photo-thermal units (multiples of temperature summations and average day-light hours) required to mature wheat, on the basis of existing phenological and meteorological records, and (c) to develop criteria for predicting, during any season, the date of the wheat harvest in any area included in the regions considered in this study. A review is given of different methods of correlating the growth rate and development of plants with certain major meteorological factors. Analyses of data indicated that monthly mean temperatures are almost as effective for computing degree-day summations as are daily mean temperatures and the data are relatively far simpler to collect. It was also concluded that for the prediction of dates of maturity of winter wheat, 1 March is a satisfactory date for starting the computation of degree-day summations. The length of the period between sowing and emergence had no apparent effect on the dates of heading and maturation of wheat. Mean temperatures appeared to be inversely related to the length of the period from emergence to maturation, but had little relation to the period from emergence to heading, or from heading to maturation. The amount of rainfall had no relation either to the total length of the growing period, or to the date of any phenological event considered.—P.J.B.

1106 Wellington, P. S. **A method for assessing premature germination in the ear in wheat.** *Proc. int. Seed Test. Ass.* 1953, **18,** No. 2, 232-8, bibl. 8. [N.I.A.B.,Cambridge]

Conditions governing the choice of methods for assessing premature sprouting of grain in the ear are reviewed. Trials were carried out to study the effect on grain sprouting in Holdfast (susceptible to sprouting) and Atle (resistant to sprouting) of (a) the length of the soaking period with fully mature ears, (b) the length of the drainage period with freshly-harvested ears, (c) the effect of chaff during the drainage period and (d) the effect of extracts obtained by soaking freshly-harvested ears. In the case of (a), ears which had been kept for 1 year after harvest were soaked in aerated distilled water for 1, 4, 8, 12 and 24 hr. After soaking, the ears were drained and incubated for 48 hr. in a saturated atmosphere. After 1, 4, 8, 12 and 24 hr. the percentage of grains with the pericarp ruptured increased from 96·5 to over 99 in the case of Holdfast as the soaking period increased; with Atle, respective percentages were 69·6, 80·3, 80·9, 86·3 and 75·4. Soaking for 8 hr. appeared to be optimum for both varieties. In studies on (b), ears of both varieties were harvested 8 weeks after anthesis, when they were harvest-ripe. The ears were soaked for 8 hr. and incubated at 16°C. Samples were removed after drainage periods of 16, 40, 64 and 112 hr. With Holdfast, respective percentages of grains with the pericarp ruptured were 11·1, 42·8, 72·6 and 92·2; with Atle, respective percentages were 0·3, 0·3, 8·3 and 50·1. The differences in response between the varieties after all drainage period treatments were highly significant. In studies on (c), fully-matured ears of both varieties were soaked for 8 hr. The grain, either alone, or enclosed in the spikelets, was incubated in a saturated atmosphere for 40 hr. With Holdfast, the percentage of grains with the pericarp ruptured where the grain was removed from the chaff, or left in the spikelet, was 3·5 and 97·9, respectively; with Atle, respective percentages were nil and 67·8. These results indicated the importance of the chaff as a source of moisture to the grain during the drainage period. In trials on (d), harvest-ripe ears were soaked for 8 hr. and fully-mature grain germinated in the extract from the ears. There was no significant effect on the embryo development of the mature grains.—P.J.B.

1107 Haensel, H. Zur Beurteilung der Auswuchsneigung bei Winterweizen. (Erste Erfahrungen mit einer neuen, einfachen Methode.) [**Testing tendency to sprout in the ear in winter wheat.** (**Preliminary experience of a new, simple method.**)] *Ber. Arbtag., Admont 1953* 15-32, bibl. 14, illus. [Probstdorf]

After referring to two earlier methods of testing ears of wheat for sprouting, in which bundles of 20 ears standing upright or single ears placed in moist filter-paper are germinated, the author's method of germinating whole, single ears in sand or earth is described and results are compared with those from the other tests. While some disadvantages are admitted, the advantages claimed for the Probstdorf method are that it can be conducted with as few as 30 ears without losing any of the accuracy achieved by the bundle test with 60 ears; that there is very little risk of losing grains from the ears; that the whole ear is evenly moistened; that results are plainly visible, and that, for the breeder, it facilitates the selection of individuals from hybrid populations.—G.M.R.

1108 Cavalaglio, F. Effetto dei fattori ambientali sulla formazione del glutine. [**Effect of environmental factors on gluten formation.**] *Ann. Fac. Agr., Perugia* 1952, **8,** 160-5, bibl. 2. [Received June, 1954]

Results from trials in which the effect of soil topography, manuring and tillage on wheat yield was studied [see *Fld Crop Abstr.* 6 : 855] showed that the factors which adversely influenced grain yield, i.e., poor soil, steep ground, shallow tillage and absence of manuring, had a favourable effect on the quantity and quality of the gluten content in the wheat grain.—E.B.O.

1109 Esbo, H. and Kolk, H. **Quality and seed value of spring wheat damaged by black stem rust (*Puccinia graminis tritici* Eriks. and Henn.).** *Proc. int. Seed Test. Ass.* 1954, **18,** No. 2, 218-31, bibl. 12, illus. [Swedish State Seed Test. Sta., Stockholm]

Studies are reported on the germination, emergence and seedling vigour in laboratory and field tests in Sweden on 5 samples of spring wheat seed taken from fields damaged by black stem rust. The samples, though visibly affected by the disease, were approved for sowing in respect of seed size by the Swedish seed testing authorities. Each sample was divided into 3 categories. The first category, comprising 4·8 - 20·7% of the different samples, was regarded as of normal seed size. The second and third categories had 20 and 40% lower 1000-grain weights, respectively, than the first category. In laboratory trials in humus-rich sandy soil and in loamy soil, there were no clear differences between the percentages of seedling emergence between any seed fraction. In field trials, seed in the third category had about 5% lower emergence than seed of the 2 larger fractions. In laboratory trials, plant weights of the second and third seed fractions, at 16 days after sowing, were 12 and 33% lower than that of the first fraction. In field trials, these differences were more marked ; at 3 months after sowing, the plant weights of seed of the second and third fractions were still 6 and 16% lower, respectively, than that of the first category. It was concluded that, in the case of seed damaged by black stem rust, the results of normal germination tests were unreliable for estimating germinating capacity and shooting vigour.—P.J.B.

1110 SUNESON, C. A. **Effect of stem rust on the yield of wheat.** *Agron. J.* 1954, **46,** No. 3, 112-14, bibl. 9. [Univ. California, Davis]

Data are given on the effect of stem rust [*Puccinia graminis tritici*] during 3 seasons on the grain yield of a number of wheat strains with different genetic resistance to the pathogen. Strains used were Baart, Baart 38 and 46 and Onas 49 and 53. Rust readings on 8 October on plots sown on 10 July, 1952, were 75, 25 and 1% for Baart, Baart 38 and Baart 46, and 87% and nil for Onas 49 and Onas 53, respectively. Grain yield reductions in Baart, as compared with Baart 46, ranged from 25 to 47% ; those in Onas 49, as compared with Onas 53, from 39 to 56%. Loss in kernel weight was the major factor contributing to yield decreases. Yields of Baart 38, with moderate stem-rust resistance, were 6-20% lower than those of Baart 46. Baart 38 has a resistance comparable with that of the varieties commonly grown in California and is sufficient to limit the development of natural epidemics in that State. From these results, it was concluded that weak and somewhat variable genetic resistance to stem rust may provide more protection than is commonly suspected and that almost complete immunity levels may not be needed in commercial varieties.—P.J.B.

1111 CROSIER, W. F. **Black kernel smudge of wheat seed.** *Proc. int. Seed Test. Ass.* 1953, **18,** No. 2, 205-17, bibl. 9. [New York State Agric Exp. Sta., Geneva, N.Y.]

Studies are reported on wheat seed discoloured by black point, also known as black kernel smudge, grown in New York State and stored for different periods before germination. In trials with black-pointed and clean seed stored for 4 years in a warm laboratory, black-pointed seed was as viable as clean seed and there was no evidence that the use of mercuric seed dressings would benefit black-pointed seed more than clean seed. It appeared that the black-point condition in the samples studied was due to weakly parasitic, or saprophytic, species of fungi, borne both externally and internally, and which could be controlled by fungicidal treatment. The 1000-grain weight of black-pointed seed grown in the north-eastern States of the USA was, in all cases, greater than that of clean seed, the average difference being about 10%. Fungus contamination of seed decreased as the storage period increased. *Alternaria* spp. and *Curvularia* spp. could still be isolated from seed after 4 years' storage.—P.J.B.

1112 HANSON, E. W. and CHRISTENSEN, J. J. **The black point disease of wheat in the United States.** *Tech. Bull. 206. Minn. agric. Exp. Sta.* 1953, pp. 30, bibl. 31.

Different aspects of black point disease in wheat seed, caused principally by *Alternanthera* spp. and *Helminthosporium* spp. are reviewed and examined, including its prevalence in the USA, the effect on size and weight of seed and on germination and seedling stands. Data are given of trials in which Semesan Jr. was used to control seedling blight caused by *Helminthosporium* spp., *Alternanthera* spp. and *Fusarium* spp. Benefit in terms of seedling stands was not obtained where *Alternanthera* spp. had infected the seedlings ; in the case of the other 2 pathogens, seed treatment, except in the case of seed samples from Montana, Indiana and Washington, considerably increased stands. Vulgare wheats were much less susceptible to black point than durum wheats. Among hard, red, spring wheats, Marquis, Ceres and Regent were least susceptible and the durum varieties Mindum and Kubanka were most susceptible to black point.—P.J.B.

1113 CENOZ, H. P. Resistencia al carbón volador del trigo. [**Resistance of wheat varieties to loose smut.**] *Rev. Invest. agric. Buenos Aires* 1952, **6,** No. 1, 29-87, bibl. 44. [Inst. Fitotec., Castelar, Argentina].

Results are given of investigations made in 1944-8 into the resistance of numerous varieties of wheat [*Triticum vulgare*] to attacks of *Ustilago tritici* induced by inoculation. The resistance of other species of *Triticum* was also tested. Among varieties cultivated in Argentina, only one, Sinvalocho M.A., was completely immune throughout the period of the tests. The results are tabulated and the varieties are classified as : immune (less than 1% infection), very resistant (1-10%), resistant (11-25%), susceptible (26-50%) and very susceptible (51-100%). Numerous non-Argentinian varieties showed less than 1% infection. Most varieties of *T. durum*, *T. monococcum*, *T. dicoccum*, *T. polonicum*, *T. marcha* and *T. timopheevi* were immune or almost immune. *T. compactum*, *T. sphaerococcum* and *T. turgidum* were susceptible.—W.J.B.

1114 Glynne, Mary D. **Cereal foot and root rots.** [**Eyespot and take-all.**] *Rep. Rothamst. exp. Sta. 1953* Harpenden, 1954, 94-5.

The influence of type of rotation, seed rate and the rate and time of applying N on the incidence of eyespot (*Cercosporella herpotrichoides*) and take-all (*Ophiobolus graminis*) in wheat, was studied. On plots on which Squareheads Master wheat, grown in 1953, was the first, second, third or fifth consecutive cereal crop, the percentage of straws affected by take-all was 0·3, 24, 34 and 45%, respectively and the percentage of straws affected by eyespot was 16, 47, 82 and 63%, respectively. Decreasing the seed rate of wheat from 3 to 1·5 bushels per ac. decreased take-all and increased yield by 3-5 cwt. per ac. Sulphate of ammonia at 2 and 4 cwt. per ac. reduced take-all compared with no application of N.—W.J.B.

1115 Potter, C. and Raw, F. **Field experiments. Control of wireworms.** *Rep. Rothamst. exp. Sta. 1953* Harpenden, 1954, 115-16.

The residual effect on wheat-grain yields in 1953 of insecticides applied as a seed dressing or drilled with the seed of wheat to control wireworm in 1951 was tested. The following treatments were applied in 1951 : (a) BHC seed dressing at 2 oz. per bu. of seed, (b) 3·5% BHC dust drilled with the seed at 56 lb. per ac., (c) 1·78% Aldrin dust drilled with the seed at 200 lb. per ac., (d) 5% Chlordane dust drilled with the seed at 100 lb. per ac. and (e) 5% DDT dust drilled with the seed at 150 lb. per ac. The additional yields of grain, compared with the yield from untreated plots (21·6 cwt. per ac.), obtained in 1953 from the plots receiving treatments (a), (b), (c), (d) and (e), respectively, were 1·3, 8·6, 13, 11·3 and 5·1 cwt. per ac. These yields showed a good correlation with the wireworm population figures for the different plots.—W.J.B.

1116 Keller, C. and Baggiolini, M. Les stades repères dans la végétation du blé. D'après l'échelle phénologique élaborée par W. Feekes. [**Stages in the growth of wheat defined. From a phenological scale drawn up by W. Feekes.**] *Rev. rom. Agric.* 1954, **10,** No. 3, 17-20, bibl. 1, illus. [Sta. féd. Essais agric., Lausanne]

A scale of notation is proposed in which the growth period of wheat is denoted by the letters A to G, the reproductive period by H to R, and the maturation period by S to W. Each letter marks a clearly defined stage, e.g. A = emergence of the coleoptile above ground, B = formation of the first leaf, and so on. The successive stages are illustrated by drawings. Possible applications of the scale are listed.—G.M.R.

1117 Johnson, V. A. **Environmental factors affecting plant height in winter wheat.** *Agron. J.* 1953, **45,** No. 10, 505-8, bibl. 8. [Nebraska Agric. Exp. Sta., Lincoln]

Studies are reported of the independent effects of photoperiod, light intensity and geographic location on the height and culm characteristics of 14 winter-wheat varieties differing widely in origin and time of maturity. In the photoperiod trials, 5 varieties were germinated on 10 October, vernalized by placing outside the greenhouse until 10 December, and then subjected to photoperiods of 13, 16 and 19 hr. The mature plant height of all varieties decreased as photoperiods increased from 13 to 19 hr. Varietal response differed. The average height of Norin 56, Blue Jacket and C.I. 12250 did not significantly differ when grown under 13 and 16 hr. photoperiods, while increasing photoperiods from 16 to 19 hr. significantly reduced the plant height of all these 3 varieties. Pawnee averaged 4·2 in. less in plant height under 16 than under 13 hr. photoperiods, while increasing photoperiods from 16 to 19 hr. reduced height by 1 in. only. Seu Seun 27, the shortest of the varieties under all photoperiods, was reduced in height by approximately equal amounts following each 3 hr. increase in photoperiod. In 13 hr. photoperiods, Pawnee was 1·2 in. taller than Norin 56, but under 16 hr. photoperiods it was 3·1 in. shorter. The effect of shading to produce 64, 34, 24 and 11% of normal light resulted in progressive weakening of the plants as shading increased. The above light intensities resulted in grain yields of 156, 94·7, 49·3 and 22·7 g. per 6 ft. of row, with kernel weights of 13·1, 9·6, 7·3 and 6 g. per 500 kernels, respectively. Controls in full light produced 149·7 g. of grain per 6 ft. row, with a kernel weight of 13·3 g. per 500 kernels. To test the effect of geographic location on plant height, 13 varieties were grown at Lincoln, Nebraska ; Manhattan, Kansas ; Stillwater, Oklahoma ; and at Denton, Texas. The common number of above-ground internodes produced was 5 for all varieties, irrespective of plant height. Plant heights of the varieties varied widely from location to location, though their relative height rank at each location was similar, except where responses associated with early-maturing tendencies were involved.—P.J.B.

1118 Kornilov, A. A. [**Completion of the light stage of development in wheat.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **92,** No. 1, 173-6.

[See also *Fld Crop Abstr.* 4 : 663.]

1119 Koch, R. B. and others. **A rapid method for the determination of cereal lipase activity.** *Cereal Chem.* 1954, **61,** No. 2, 113-20, bibl. 12.

The method involves electrometric titration of the free fatty acids liberated in an emulsified reaction mixture of freshly-milled wheat germ.—P.J.B.

1120 BANERJEE, R. M. and DAS, N. B. **Studies on the diastatic activity of certain Indian wheats.** *Indian J. agric. Sci.* 1954, **24,** Pt. 1, 45-9, bibl. 10, illus. [Indian Agric. Res. Inst., New Delhi]

1121 FAJERSSON, F. Örigheten som växtodlingsproblem. [**Grittiness as a problem of plant cultivation.**] *Agri hort. Genet., Landskrona* 1953, **11,** No. 3-4, 149-207, bibl. 52, illus., English summary pp. 202-3.

Aspects reviewed include the determination of grittiness in wheat flour, the nature of grittiness, and hard and soft wheat as related to grittiness. The results are given of studies on the reliability of the sieving method of determining grittiness, the effect of protein content of the grain and the moisture content of milled grain on grittiness, grittiness and the ash content of grain and the relation between baking quality and grittiness. Studies on the effect of protein content on grittiness in the varieties Ergo, Aros, Banco, Ertus and Eroica showed that grain with very low protein contents had inferior grittiness values compared with wheat with moderate or high protein contents. Among varieties of winter wheat, Banco, Eroica, Eroica II and Ertus had good grittiness values and were consequently grouped as hard wheats. Among soft varieties of winter wheat were : Aros, Ergo, Hansa, Odin, Skandia III and Virtus. Among varieties of spring wheat, all, except Fylgia, were classified as hard wheats on the basis of grittiness. N. American spring wheats, grown in Sweden, were not more gritty than Swedish spring wheats.—P.J.B.

1122† RANJAN, S. and KAUR, RAVINDER. **Studies on hormones. 1. Effect of hormone injections of the spikes of wheat on the metabolic activities of the leaves.** *Proc. Indian Acad. Sci. Sect. B* 1951, **33,** No. 4, 221-30, bibl. 6, illus. [Received June, 1954]

1123 STOKES, Anne. **Uptake and translocation of griseofulvin by wheat seedlings.** *Pl. and Soil* 1954, **5,** No. 2, 132-42, bibl. 14. [Butterwick Res. Lab., I.C.I. Ltd., Welwyn, Herts, England]

A technique for studying the factors affecting the upward translocation of griseofulvin in wheat seedlings on a quantitative basis is described.—P.J.B.

1124 HOAGLAND, A. R. and others. **Some histological and morphological effects of maleic hydrazide on a spring wheat.** *Agron. J.* 1953, **45,** No. 10, 468-72, bibl. 8, illus. [Washington Agric. Exp. Sta., Pullman]

The studies reported were made to determine the effect of maleic hydrazide on tissue differentiation and on the subsequent development and grain yield of Marfed spring wheat. In the summer of 1951, 50, 100, 200, 400, 800 and 1600 ppm. concentrations of maleic hydrazide were made to spring wheat at the following growth stages : (a) emergence, or first to second leaf stage, (b) third to fourth leaf stage, (c) second tiller stage and (d) many tiller stage. One week after treatment, samples of growing points were taken for histological study. Grain yields decreased in a substantially linear manner at all growth stages as maleic hydrazide concentrations increased. At all growth stages, grain yields following the application of 50, 100, 200, 400, 800 and 1600 ppm. concentrations of maleic hydrazide averaged 269, 270, 249, 244, 222 and 192 g. per plot. Mean yield reductions per 100 ppm. increases in maleic hydrazide concentration were 1·96, 3·81, 8·31 and 5·65 for growth stages (a), (b), (c) and (d), respectively. Growth stage (c) appeared to be critical in terms of sensitivity to increasing concentrations of maleic hydrazide. The seed-set of the heads of treated plants was very irregular, particularly following treatment at stage (c). Anther size and stigmatic branching were reduced most by treatment with 800 and 1600 ppm. concentrations at stages (c) and (d). Tissue differentiation in the growing point was affected by concentrations of 1600 ppm. at stage (b) and of 800 and 1600 ppm. at stages (c) and (d).—P.J.B.

1125 CARLES, L. and others. Sur la physiologe normale du blé et sa réaction [à] la fertilisation azotée. [**The normal physiology of wheat and its reaction to nitrogen fertilization.**] *C.R. Acad. Agric. Fr.* 1954, **40,** No. 7, 282-8, bibl. 7.

The optimum N fertilization is considered, not from the standpoint of yield, but of plant health. Plant health is regarded as a state in which functions are in equilibrium. A standard for defining this equilibrium more precisely is provided by the proportions of protein present in the plant as a whole and in its various parts. All tillers of a given variety of wheat have the same proportion of protein. For each variety of wheat this proportion is an inherited character and, within extreme limits, is stable and independent of environment. The amount of protein is self-maintained at this proportion by absorbing the required amount of nitrogen through the roots, but much more so by distributing proteins through the plant during growth. The principle here advanced can be used to investigate the correct timing and amount of N fertilizer to be applied at different stages of growth.—D.B.

1126 REEVES, J. T. **Some effects of spraying wheat with urea.** *J. Aust. Inst. agric. Sci.* 1954, **20,** No. 1, 41-5, illus. [West. Aust. Dep. Agric., Perth]

Synthetic urea, a fertilizer containing 46% nitrogen, was sprayed on to growing wheat plants in late winter and early spring. Although the yields were increased, the most significant improvement occurred in the baking quality of the grain. The percentage of mottled grain in a translucent grained variety was also decreased. The widespread use of boom and aerial spraying for the control of weeds appears to be a means by which urea can be applied, if necessary, already mixed with the insecticide or fungicide. Whether this method of applying nitrogen is an economic possibility on a large scale has not yet been demonstrated.—Author's summary.

1127 CHESNIN, L. and SHAFER, N. **Foliage applications of urea solutions to grain and forage crops.** *Agron. J.* 1953, **45,** No. 11, 576. [Nebraska Agric. Exp. Sta., Lincoln]

Notes are given on trials to compare the effects of foliar sprays of urea, made to wheat, maize, bromegrass [*Bromus inermis*] and lucerne. Urea concentrations ranged from 100 lb. urea in 500 gal. water, to 800 lb. urea in 100 gal. water, the latter solution being almost saturated. Coarse and fine sprays were used. Applications of almost saturated solutions of urea to wheat in the flowering stage, at rates up to 60 lb. N per ac., resulted in no injury. Maize was very sensitive to droplet size where nearly saturated solutions were used. 20 lb. N per ac. applied to maize in a fine spray caused no burning ; the same amount of N in a coarse spray caused marginal leaf burn, which increased where 40 lb. N was applied. Split applications of urea at weekly intervals greatly reduced plant injury.—P.J.B.

1128 WILLIAMS, B. C. and SMITH, F. W. **The effects of different rates, times, and methods of application of various fertilizer combinations on the yield and quality of hard red winter wheat, 1949-50.** *Proc. Amer. Soc. Soil Sci.* 1954, **18,** No. 1, 56-60, bibl. 5. [Kansas Agric. Exp. Sta., Manhattan]

The results are given of studies at locations in Kansas to determine the effect of N alone and in combination with P and K and the effect of time and method of application of N, on the yield and quality of wheat. The use of N increased grain yields at all locations ; rates up to 50 lb. $P_2O_5$ per ac. also increased yields. Rates up to 25 lb. $K_2O$ per ac. had little effect on yields. Top-dressings of N during winter or early spring resulted in higher yields than where the N was applied before sowing. At 2 locations (Belleville and Goddard) there were no differences between yields where $NH_4NO_3$ and $CaCN_2$ were used as carriers of N. At Manhattan and Thayer, 50 lb. N per ac. applied as $NH_4NO_3$ resulted in mean yields of 42·3 and 38·2 bu. per ac., compared with 39 and 34·5 bu. per ac., respectively, where $CaCN_2$ was used. N treatments, alone, or in combination with P and K, increased the protein content of the grain in a number of cases, particularly where heavy rates of N were used. At 3 out of 4 locations, the use of 50 lb. $P_2O_5$ tended to decrease the protein content of the grain slightly. The application of 25 lb. $K_2O$ per ac. increased the protein content at Manhattan from 12·1 to 12·4%, but decreased it slightly at the other location. The use of $NH_4NO_3$ resulted in slightly higher protein contents in the grain than the use of $CaCN_2$.—P.J.B.

1129 FAJERSSON, F. Fosfatgödslingens inverkan på vetets kvalitet. [**The effect of phosphatic manure on the quality of wheat.**] *Agri hort. genet., Landskrona* 1953, **11,** No. 3-4, 109-121, bibl. 24, English summary, 118-19.

In two trials in the Uppland Province of Sweden, applications of nil, 400, 1600 and 6400 kg. superphosphate per ha. were made to Odin and Eroica II wheat. The P treatments did not result in grain yield increases. In one trial in Scania, applications of nil, 200, 400, 600, 800 and 1600 kg. superphosphate per ha. were made to Eroica wheat ; in these trials, the P treatments resulted in grain yield increases. Data are given of the crude protein, ash and P content of the grain, the gluten content, type of gluten, Pelshenke's test number, grittiness, viscosity (cold, Hagberg's method), Bergs number, specific dough-weight, specific bread volume without bromide treatment, and specific bread volume with optimum bromide treatment. In most cases increasing rates of P application increased the phosphorus and ash content of the grain and of the flour (60% extraction) made from the grain. The protein content of the grain decreased as rates of P treatment increased, except at the highest rate of P treatment. In the first two trials, the mean crude protein content of grain receiving nil, 400, 1600 and 6400 kg. superphosphate per ac. was 11·8, 11·4, 10·8 and 11·4%, respectively. Values for Pelshenke's test decreased as P treatments increased. Viscosity decreased as P treatments increased, except at the highest P treatment in all trials, when viscosity values rose again ; specific dough-weight and bread volume (with optimum bromide treatment) showed similar tendencies. In the trial where P treatments caused a grain yield increase, protein content, viscosity, dough-weight and bread volume (with optimum bromide treatment) values rose as P treatments increased, but fell again when relatively high rates of P were used. Observations are made on varietal differences. From these results, it was concluded that P treatments where a deficiency of P exists, improve the baking quality of wheat ; where no deficiency of P exists, P treatments adversely affect baking quality.—P.J.B.

1130 MURDOCK, J. T. and SEAY, W. A. **The effect**

**of a soil conditioner on uptake of superphosphate by greenhouse wheat.** *Proc. Amer. Soc. Soil Sci.* 1954, **18,** No. 1, 97-8, bibl. 2. [Kentucky Agric. Exp. Sta., Lexington]

The effect of soil applications of the Na salt of hydrolyzed polyacrylonitrile on the crop yield, P content, and recovery of manurial P by wheat, was studied. The soil used was a silt loam of poor physical condition and a low content of available P. Factorially combined treatments of nil and 2000 lb. per ac. of the soil conditioner and nil and 20 lb. $P_2O_5$, with $P^{32}$ as a tracer, were used. Application of the soil conditioner increased the P content of the wheat and the percentage of manurial P recovered by the plants, but did not significantly affect plant yields. The effect on the plants of the soil conditioner in releasing soil P was considerably less than the effect of the applied P.—P.J.B.

1131 Marx, T. and Sahm, U. Gefässversuche mit Weizen mit steigenden Gaben Müllerde und Müllohum. [**Pot trials of wheat grown with increasing doses of town refuse and of "Müllohum".**] *Z. PflErnähr. Düng.* 1954, **64 (109),** No. 2, 113-19, bibl. 7. [Biol. Zentralanst. Land-Forstw., Berlin-Dahlem]

The material tested was Berlin town refuse, rotted for 20 years and then sieved, and "Müllohum," which is a commercial product composed of town refuse, sludge, and industrial refuse with a high content of trace elements and up to 10% peat. The Berlin refuse applied to wheat in sand soils resulted in considerable increases in yield (from 152 to 559%), although when it was applied together with full manuring the increases were not so impressive (102 to 237%). No good results were obtained from Müllohum applied to wheat in subsoil sand until the higher doses were reached (75, 225 and 450 g. per pot of 7·5 kg. capacity). The application of the same doses of Müllohum to field earth resulted in the crusting and hardening of the soil, intensified when mineral fertilizers were also applied, but yield increases were satisfactory (109 to 150%) when Müllohum was applied without mineral fertilizers to wheat grown in earth.—G.M.R.

1132 Hummel, B. C. W. and others. **Grain storage studies. XIII. Comparative changes in respiration, viability, and chemical composition of mold-free and mold-contaminated wheat upon storage.** *Cereal Chem.* 1954, **31,** No. 2, 143-50, bibl. 11. [Univ. Minnesota, St. Paul]

1133 Baker, V. H. and others. **Lethal effect of electrons on insects infesting wheat and flour—Part I.** *Agric. Engng, St. Joseph, Mich.* 1953, **34,** No. 11, 755-8, bibl. 11, illus. [Michigan Agric. Exp. Sta., East Lansing]

Observations are reported on the effect of different intensities of electron irradiation made to *Tribolium confusum* and *Sitophilus granarius*, eggs and adults. The irradiation was produced by a 2 mev. Van der Graaf generator. Dosages of 10,000 rep. sterilized the eggs of both species and prevented the adults reproducing, but had a detrimental effect on seed germination. The baking quality of irradiated flour and wheat was satisfactory.—P.J.B.

1134 Baker, V. H. and others. **Lethal effects of electrons on insects which infest wheat, flour and beans—Part 2.** *Agric. Engng, St. Joseph, Mich.* 1954, **35,** No. 6, 407-10, bibl. 11, illus. [Michigan State Coll., East Lansing]

[See previous Abs.] Further information is presented on the calculation of irradiation dosage, the penetration of electrons into, and the rise of temperature in, irradiated samples of grain, and further effects of irradiation on wheat, flour and beans.—P.J.B.

## BUCKWHEAT

1135 Krylov, A. V. and others. [**Methods of sowing *Fagopyrum esculentum*.**] [Russian] *Sovet. Agron. (Soviet Agron.)* 1953, **11,** No. 5, 43-50.

Buckwheat grows rapidly and exterminates weeds by its aggression. Tests of yields from narrow- (26-32 cm.) and wide-spaced (36-45 cm.) sowings have been made during the last 5 or 6 years on more than 200 trial plots in 60 provinces of the USSR. Results were inconclusive.—M.H.

## OATS

1136 Pendleton, J. W. **The effect of lodging on spring oat yields and test weight.** *Agron. J.* 1954, **46,** No. 6, 265-7, bibl. 4, illus. [Illinois Agric. Exp. Sta., Urbana]

In trials in Illinois during 1952-3, Clinton oats were artificially lodged at 4 days after heading, or at 20 days after heading (hard-dough stage). Angles of lodging used were 45° or 90° (flat). Mean yields in 1952-3 of plants not lodged were 68·2 bu. per ac. Plants lodged to 90° and 45° at 4 days after heading gave average yields of 43·1 and 58·8 bu. per ac., while those lodged to 90° and 45° at 20 days after heading yielded 56·3 and 59·5 bu. per ac., respectively. These results are discussed in relation to significant variety × year and variety × location interactions which occur in small-grain varietal trials.—P.J.B.

1137 CROWDER, L. V. **The effect of date of planting and clipping on oat forage and grain yields.** *Agron. J.* 1954, **46,** No. 4, 154-7, bibl. 15. [Georgia Agric. Exp. Sta., Athens]

The early oat varieties Arlington and Victorgrain and the late variety Terruf were sown in mid-August, mid-September and mid-October during 1946-8 in Georgia. The following clipping treatments were made to the plants: (a) no clipping, (b) clipped in November and on 1 March, (c) clipped in November and on 1 and 20 March, (d) clipped in November and on 1 and 20 March and 15 April. Oats sown in October produced too little forage to be harvested in November. Oats sown in August and September gave dry forage yields ranging from 90 to 910 lb. per ac. in November. Dry-forage yields on 1 March did not differ significantly between varieties, or sowing dates. At the 20 March harvest, forage yields varied widely from year to year, particularly in the case of Arlington. Mean dry forage yields on 15 April for Terruf, Arlington and Victorgrain averaged 1195, 925 and 880 lb. per ac. The dry forage yields of all varieties sown in August, September and October averaged 830, 750 and 1415 lb. per ac., respectively. The grain yield of oats sown in August, September and October, with no clipping treatment, averaged 49, 47 and 60 bu. per ac., respectively. Oats sown on these dates and subjected to treatment (b) yielded 37, 37 and 53 bu. per ac., oats subjected to treatment (c) yielded 23, 22 and 35 bu. per ac., and oats subjected to treatment (d) gave average yields of 3, 2 and 8 bu. per ac., respectively. From these results, it was concluded that for winter grazing in the region of these studies, oats should be sown before the date generally recommended for grain production and grazing animals should be removed before 1 March. The economics of the data from these studies are considered.—P.J.B.

1138 DOBBEN, W. H. van. Proefnemingen met mengcultuur van haver en gerst in 1952. (Serie 163.) [**Trials with oats/barley mixtures in 1952. (Series 163.)**] *Stencilled Rep. Interprov. Trials 42. Cent. Inst. agric. Res. Wageningen, Neths* 1953, pp. 10 + append., bibl. 1, illus. [Received May, 1954]

Trials to compare the yields and growth characteristics of oats/barley mixtures with those of the component crops grown separately were continued in 1952. In Series 163A an attempt was made to grow approximately equal numbers of oats and barley plants in the mixtures; in Series 163B the ratios of barley to oats plants were approx. 2 : 1, 1 : 1 and 1 : 2. Mixtures of Herta barley with Libertas oats and Mansholt's 2-Row barley with Libertas oats were used. As well as the varieties mentioned, Frisia barley was grown as an unmixed crop. The trials were divided into those on soils with pH values greater and less than 4·6. On the average, in terms of starch equivalent [S.E.] per ha., the mixtures significantly outyielded the components grown separately on soils with a pH greater than 4·6; the yields of S.E. from the Herta/Libertas 1 : 1 mixture, Herta barley and Libertas oats were 2650, 2434 and 2418 kg. per ha. respectively. Frisia barley yielded 2830 kg. S.E. per ha. On soils with pH below 4·6 no marked gain in yields was obtained by using mixtures. The yield of the mixtures declined in relation to that of the components grown separately when sowing was late (mid-April). There was no advantage in growing the mixtures as alternate rows of barley and oats. Barley gained ground from oats on soils of the higher pH group; on soils of the lower pH group the reverse occurred. The results of 1952 indicated that a good supply of soil-moisture in summer favoured the increase of grain-weight and yield in the oats of the mixtures, apparently because a good supply of soil-moisture favoured the recovery of the oats following the ripening of the barley. The different proportions of oats to barley used did not significantly affect the yields of the mixtures except on soils of low pH where the mixtures containing the higher proportions of oats gave the best yields.—W.J.B.

1139 SCOTTISH AGRICULTURE. **Notes from Auchincruive—7.** *Scot. Agric.* 1954, **33,** No. 4, 216-18.

Notes are given on one year's trials with dredge corn (mixed oats + barley) and 5 barley varieties. The dredge corn plots showed very small lodging percentages, compared with those sown with barley alone, suggesting the need for enquiry into the minimum amount of oats in dredge corn mixtures necessary to keep barley standing. Notes are also given on trials with wheat.—P.J.B.

1140 GREAT BRITAIN. National Institute of Agricultural Botany. **Varieties of spring oats. Recommended list for 1954.** *Fmrs' Leafl. 13. N.I.A.B.* 1954, pp. 4.

1141 GREAT BRITAIN. National Institute of Agricultural Botany. **Varieties of winter oats and winter barleys. Recommended list for 1950.** *Fmrs' Leafl. 9. N.I.A.B.* 1954, pp. 3.

1142 MURPHY, H. C. **Registration of oat varieties, XVIII.** *Agron. J.* 1953, **45,** No. 11, 568-70, bibl. 23. [Pl. Industr. Bur., U.S. Dep. Agric.]

Varieties described are: Mohawk, Craig, Le Conte, Taggart and Southland (Reg. Nos. 127-131, respectively). Mohawk was produced from a Bond × Iowa D67 cross and is an early, stiff-strawed, medium-tall variety, similar to Clinton in agronomic character. It is resistant to *Helminthosporium victoriae* and to the relatively older races of crown rust, but not to Races 45, 57 and 101. In 3-years' tests in New York State, Mohawk, Clinton and Vicland gave average yields of 62·5, 63·3 and 36·6 bu. per ac., respectively. Craig was produced from a cross Ithacan × Victoria. It is a mid-season variety, with stiff, short straw, resistance to smut (*H. victoriae*) and has moderate resistance to crown rust. It is best adapted to western and central New York. In trials during 1949-52 in New York, respective average yields of Craig, Mohawk, Advance and Ajax were 65·2, 58·4, 58·2 and 70·8 bu. per ac. Le Conte was produced from a Bond × Tennex cross, designed to secure a variety combining the straw stiffness, high test-weight and disease resistance of Bond, with the high yield and winterhardiness of Tennex. It is adapted to Tennessee. Taggart was selected from a Fulghum (H.C.726) × Bond cross. It is a stiff-strawed, autumn-sown variety. In trials at Stuttgart, Arkansas, during 1948-52 it yielded an average of 79·7 bu. per ac., compared with 75·2, 72·2 and 66·6 bu. per ac. for De Soto, Traveler and Ferguson, respectively. It is winter-hardy at Stuttgart. It is not outstanding in disease resistance. Southland was produced in north Florida from a cross (Iowa D69 × Bond, C.I.3841) × Fultex. Southland is medium-early, with high resistance to *H. victoriae* and moderate resistance to Races 45, 57 and similar races of crown rust. It is adapted to the Gulf Coast region of the USA, only. In trials in Florida during 1949-52, Southland, Red Rustproof 14 and Camellia gave average grain yields of 57·5, 46·2 and 42 bu. per ac., respectively. It also gave the highest forage yields.—P.J.B.

1143 MIDDLETON, G. K. and others. **Protein content of certain fall-sown oat varieties.** *Agron. J.* 1954, **46,** No. 6, 282-4, bibl. 8. [N. Carolina Agric. Exp. Sta., Raleigh]

Data are given of the protein content of the grain of 15 oat varieties grown at 9 locations in the south-eastern States of the USA. There were highly significant differences between varieties, and between locations and there was a highly significant variety × location interaction. The range of average protein content in the varieties extended from 11·49 for De Soto to 13·21 for Taggart. The average protein content of all varieties ranged from 10·62% at Allensville, Kentucky, to 15·09% at State College, Mississippi. There was no significant correlation between yield and protein content. Data are given of the protein content of 70 varieties and strains of oats taken from the World Oat Collection, grown at 3 locations in N. Carolina. There were significant differences between varieties and strains, but not between locations.—P.J.B.

1144 FINKNER, R. E. and others. **Varietal reaction and inheritance of fluorescence in oats.** *Agron. J.* 1954, **46,** No. 6, 270-4, bibl. 16. [Iowa Agric. Exp. Sta., Ames]

Data are given of the reaction to fluorescent light of 141 varieties of oats and 23 segregating progenies of oat crosses.—P.J.B.

1145 WEST, D. W. **Luminescence test of oat varieties.** *Proc. Ass. off. Seed Anal. N. Amer. 1953* 115-16, bibl. 5. [Iowa State Coll., Ames]

The studies reported were made to test the validity of the luminescence method of distinguishing between white- and yellow-seeded oat varieties. Seed with ivory, pink, white, or grey lemmas showed a blue luminescence, while those with yellow lemmas showed no luminescence. From the results of these studies, it was concluded that the test was a valid guide for distinguishing mixtures of certain varieties or selections of oats.—P.J.B.

1146 JONES, B. **Field plantings of some oat varieties observed under ultra-violet light.** *Proc. Ass. off. Seed Anal. N. Amer. 1953* 45-9, bibl. 4. [Oklahoma State Seed Lab., Oklahoma City]

Observations are given of the luminescence of the seed of a number of oat varieties under ultra-violet light. In comparisons of the luminescence of given seed samples and of seed taken from plants grown from the same samples, it was concluded that luminescence of the grain was a genetic character. —P.J.B.

1147 SIMONS, M. D. **The relationship of temperature and stage of growth to the crown rust reaction of certain varieties of oats.** *Phytopathology* 1954, **44,** No. 5, 221-3, bibl. 8. [Iowa Agric. Exp. Sta., Ames]

Eleven varieties of oats were inoculated at the seedling, juvenile, boot and anthesis growth stages and incubated in the greenhouse at 15 or at 25°C. The inoculant used was a pure culture of Race 205 (an atypical biotype of Race 45) of crown rust (*Puccinia coronata* var. *avenae*). In most varieties, susceptibility was greater at 25 than at 15°C. Landhafer did not exhibit uredia formation at 15°C., but resistance broke down at 25°C. Santa Fe, Clintafe, Clintland and Bondvic were resistant at both temperatures. Mo. 0-205 was highly susceptible to crown rust in the seedling stage, but highly resistant when mature at both temperatures. At 15°C., Appler, Marion and Cherokee were susceptible at the seedling stage, but moderately resistant when mature ; at 25°C., the varieties were susceptible at all growth stages. These findings were based on uredial development; data are also given on resistance in terms of telial development.—P.J.B.

1148 Tessi, J. L. Razas de distinto poder patógeno dentro de "*Pseudomonas striafaciens*" en Argentina y reacción de variedades de avena a su ataque. [**Strains of *Pseudomonas striafaciens* in Argentina showing varying degrees of pathogenicity to oats and the reactions of oat varieties to their attacks.**] *Rev. Invest. agric., Buenos Aires* 1952, **6,** No. 2, 235-45, bibl. 11, illus. [Inst. Fitotec. Castelar, Argentina]

1149† Novikov, V. P. [**Development of the oat panicle under different conditions of water supply.**] [Russian] *Bot Ž. SSSR* (*Bot. J. USSR*) 1954, **39,** No. 1, 17-20, bibl. 4, illus.
The study is concerned with the mesophyte Kytö (*Avena sativa* var. *aurea*) and the drought-resistant Byzantina 11 (*A. byzantina* var. *culta*). The following conclusions are drawn from the tests. Insufficient water supply to Kytö at the vernalization stage did not produce any marked effect on apical development, but in Byzantina 11 insufficient water at this stage accelerated apical differentiation. At the light stage of development, insufficient water retarded panicle development in both types of oat (especially in Byzantina 11). Insufficient water from the stage of tetrad formation to flowering curtailed the length of the panicle in both varieties and greatly lowered the number of spikelets formed.—M.H.

1150 Poljakov, Ju. A. [**The possibility of a toxic effect on crops of heavy water.**] [Russian] *Počvovedenie* (*Pedology*) 1953, No. 7, 25-32, bibl. 9, illus. [Dokučaev Soil Inst., Acad. Sci. USSR]
This study was carried out on oats and barley seedlings. [See also *Soils and Ferts* 16 : 2325.]—M.H.

1151 Frey, K. J. and Baten, W. D. **Optimum plot size for oat yield tests.** *Agron. J.* 1953, **45,** No. 10, 502-4, bibl. 10. [Michigan Agric. Exp. Sta., East Lansing]
An area sown with a single variety of oats was harvested in plots 1 × 4 ft. in size. The yield data from these one-row units were arranged in plots of different sizes, ranging from 1 to 8 units. The coefficient of variability did not decrease materially for plots larger than 4 units. With cost functions included, the optimum plot size was also 4 units. The number of replications needed to obtain a precision such that the standard error of the variety mean equalled 3% of the experiment mean was 5 where the coefficient of variability was used, and 9 where cost functions were used. With current sowing and harvesting methods, the best plot shape was a plot 4 rows wide and 8 ft. long, with the two centre rows to be harvested.—From authors' summary.

## RYE

1152 Great Britain. National Institute of Agricultural Botany. **Rye.** *Fmrs' Leafl. 12. N.I.A.B.* 1953, pp. 2.

1153 Michael, G. and Bergmann, W. Bodenkohlensäure und Wurzelwachstum. [**Carbonic acid in the soil and root growth.**] *Festschr. Z. PflErnähr. Düng* 1954, **65,** No. 1-3, 180-94, bibl. 14. [Univ. Jena, E. Germany]
Rye seedlings (*Secale cereale*), 2 to 3 weeks old, were grown in glass cylinders to study root development under different environmental conditions related to the physical structure of the soil. Root development was assessed, not by the weight of roots but by their growth in length. High water-content of the soil, treating the soil with N or $CO_2$, compressing the soil surface, compacting the whole soil, increasing soil temperature and increasing the number of plants per cylinder all reduced growth in length of roots, occasionally by as much as one-half. This inhibition of growth is attributed to an enrichment of the soil with $CO_2$ in the neighbourhood of the roots resulting in a reduced gas exchange. The addition of activated carbon reduced the bad effect on root growth of the above-mentioned factors and in some cases caused an increase in length of roots. When applied to agriculture, the findings of these experiments explain the harmful effect of standing water, heavy soil, seasons of heavy rainfall, compaction of soil, and close sowing through restricting the circulation of $CO_2$. Similar experiments were conducted on rice (*Oryza sativa*) which proved to be much less sensitive, but not insensitive, to stationary $CO_2$. The fact that rice is not entirely insensitive shows that circulating $CO_2$, and a soil structure which allows this, are essential for root growth in length and hence for drought resistance.—D.B.

## BARLEY

1154 Kolesnik, I. [**Winter barley in the Ukraine.**] [Russian] *Soc. seljs. Hoz.* (*Social. Agric.*) 1954, **25,** No. 4, 22-8.
Barley is grown under a variety of conditions in the USSR, namely, in polar areas, in the southern steppe and in mountainous regions. Such adaptability is attributed to the multiplicity of barley types and (compared with other grain crops) the short vegetative period of barley. The main types grown in USSR are those required for brewing and for fodder purposes. The qualities required for brewing are found chiefly in the winter forms (12-13% protein ; 1000-grain wt. not less than 30 g. ; and low percentage, 7-10, husk in the grain). The following yields of winter and spring forms have been recorded in the steppe zone of the

Ukraine: winter form (Odessa 17), 2390 kg./ha. grain and 6160 kg/ha. straw; spring forms yield, respectively, 1120 and 3180 kg./ha. grain and straw. The advantages of winter barley compared with spring forms are attributed to its greater ability to compete with weeds and to its earlier ripening. It is recommended that sowings of winter barley be greatly extended in those regions of the Ukraine where it has been demonstrated that its harvests are better than those from spring barley. —M.H.

1155† BAHTEEV, F. H. [**The biology and morphology of *Hordeum* spp.**] [Russian] *Bot. Ž. SSSR* (*Bot. J. USSR*) 1954, **39,** No. 1, 112-18, bibl. 5, illus.

The work contains a table in which the distribution (for provinces of the USSR and generally for other countries) of the following species is indicated :—*H. bogdanii*, *boreale*, *bulbosum*, *hystrix*, *leporinum*, *brevisubulatum*, *sibiricum*, *spontaneum*, *turkestanicum*, *violaceum* and *jubatum*.—M.H.

1156 MCKINNEY, H. H. **New evidence on virus diseases in barley.** *Pl. Dis. Reptr* 1953, **37,** No. 5, 292-5, bibl. 10. [Cereal Crops and Dis. Div., Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

Observations on plants of Glacier barley taken from a plot which gave low yields, showed that about 90% of the plants were infected with a seed-borne virus which caused few or no visible symptoms of virus disease in the plants. From these results, it was considered likely that the cause of "running-out" in certain varieties of barley and other crop species may be due to the presence of latent virus diseases, which are difficult to detect.—P.J.B.

1157 PENDLETON, J. W. and others. **Response of spring barley varieties to different fertilizer treatments and seasonal growing conditions.** *Agron. J.* 1953, **45,** No. 11, 529-32, bibl. 6. [Illinois Agric. Exp. Sta., Urbana]

In experiments in Illinois, 9 spring-barley varieties were grown during 1947-50, a number of them being malting varieties. The following different manurial treatments were applied annually at a rate of 750 lb. per ac.: 8-8-8 (NPK), 8-8-0, 8-0-8 and 0-8-8. The plots were on a silt-loam soil, with medium contents of P and K which were not low in N. 1947 and 1948 were excellent spring-barley years, 1949 was a poor year, with a month-long drought in summer and high temperatures, while 1950 was classed as a normal season. A highly significant variety × year interaction was observed. The yields of Montcalm and Moore were considerably reduced by conditions in 1949, while the yield of Kindred was not greatly affected. N resulted in the greatest yield increases; the use of 8-8-8 manure resulted in average grain yield increases of 11·1 bu. per ac. over the 0-8-8 treatment. It was apparent that even on relatively fertile soil, on which rotations including legumes were used, N was the primary limiting nutrient. The use of 8-8-8 manure, compared with 8-0-8, and 8-8-8, compared with 8-8-0, resulted in yield increases of 3·6 and 1·9 bu. per ac., respectively. Plots receiving N had an average of 43% lodging, compared with 24% where no N was applied. Moore and Wisconsin H-35 stood almost as well following N treatment as without N. There was a significant correlation between the origin of varieties and their performance under the conditions of these trials.—P.J.B.

1158† HOFMANN, E. and SCHIFF, H. Einfluss verschiedener N-Düngung auf Ertrag und Qualität der Wintergerste. [**Effect of different nitrogenous manures on yield and quality of winter barley.**] *Z. Pflbau* 1954, **5,** No. 1, 40-3, bibl. 7. [Techn. Hochschule München, Weihenstephan, W. Germany]

Of the N fertilizers used, calcium cyanamide, dicyandiamide and ammonium sulphate, each at 30 and 60 [kg./ha.] N, the first two gave the highest yields of grain, and dicyandiamide also gave the highest yield of straw. This fertilizer also had the strongest after-effect; the other two had practically no after-effect. Quality is considered from the point of view of the protein and enzyme content of the grain. For the German climate 60 kg.N/ha. is recommended for winter barley, but for summer barley only 20-40 kg./ha. on account of the shorter growing period.—D.B.

1159 FOOTE, W. H. and BATCHELDER, F. C. **Effect of different rates and times of application of nitrogen fertilizers on the yield of Hannchen barley.** *Agron. J.* 1953, **45,** No. 11, 532-5, bibl. 3. [Oregon Agric. Exp. Sta., Corvallis]

The trials reported were carried out under dryland conditions in the Willamette Valley of Oregon during 1950-2, on Willamette silt-loam. In 1950, an ammonium sulphate top-dressing was given before sowing, when the plants were 6 and 12 in. high, and again at heading. Urea was applied when the plants were 6 and 12 in. high, and at the early heading stage. The urea was applied at 100 gal. solution per ac. Rates of N used were 20, 40 and 60 lb. per ac. In 1951 and 1952, ammonium nitrate and urea were the sources of N. Ammonium nitrate was applied before the soil was ploughed in spring, at sowing and when the plants were 6 in. high, at rates of 25, 50, 75 and 100 lb. N per ac. Urea was applied as a spray at rates of 25, 50 and 100 lb. N per ac. in 100 gal. water when the plants were 6 and 12 in. high, and at the early heading stage. Rainfall in 1950 was 3·11 in. below the average. Barley yields were very low (27·7 bu. per ac. on untreated control plots) and there were no significant responses to N treatments. 1951 and 1952 were more favourable for barley growth than 1950 and, in most cases, there were yield increases following N treatment. With ammonium nitrate, there were significant yield increases following 25 and 50 lb. N per ac. rates of application ; rates of 75 and 100 lb. N per ac. did not result in consistent yield increases. Applying the N either at sowing time, or when the plants were 6 in. high resulted in marked yield increases over where it was applied and ploughed under before seed-bed preparation. These effects were consistent in both years. Urea-spray treatments at a rate of 100 lb. N per ac. significantly increased yields ; rates of 25 and 50 lb. N did not result in consistent yield increases. For given rates of N application, ammonium nitrate top-dressings were much more effective in raising grain yields than were the urea-spray treatments, particularly in 1951.—P.J.B.

1160 FINE, L. O. and CARSON, P. L. **Phosphorus needs of small grains on a moderately saline soil.** *Proc. Amer. Soc. Soil Sci.* 1954, **18,** No. 1, 60-3, bibl. 6. [S. Dakota Agric. Exp. Sta., Brookings]

Field and greenhouse studies were made to determine the effect of different N and P treatments on the growth and P uptake of barley and oats grown on mildly saline, intrazonal soils of the chernozem area of S. Dakota. The soil used was a Maple silt loam, with a content of 1·98 me. soluble Na per 100 g. soil, 26 me. $CaSO_4$ per 100 g. soil, a $CaCO_3$ content of 14·2% and a pH of 7·85 in the top 6 in. of soil. In greenhouse trials, the addition of no N or P to the soil resulted in yields of dry matter of 1·6 and 4·7 g. per pot for the first and second crops, respectively. The addition of 50 ppm. N to the soil resulted in yields of 1·6 and 4·9 g., while the addition of 50 ppm., each, of N and $P_2O_5$, the $P_2O_5$ as treble superphosphate, resulted in yields of 5·4 and 8·7 g., respectively. The use of 50 ppm., each, of N and $P_2O_5$ as Ammo-Phos A, plus $Na_2SO_4$ (2000 ppm.) + $CaSO_4$ (2400 ppm.) resulted in yields of 5·3 and 7·7 g., respectively. The addition of P to the soils resulted in a marked increase in the P content of the barley. In field trials, the use of up to 80 lb. $P_2O_5$ per ac. resulted in very marked increases in the grain yields of oats and barley. Amounts of over 40 lb. $P_2O_5$ broadcast resulted in the disappearance of all symptoms of saline injury, commonly found on this soil. The saline soil contained a higher total P content than adjacent, non-saline soils, though the amount of P soluble in dilute $H_2SO_4$ was lower on the saline soil. In greenhouse experiments, the addition of Na salts to saline soil markedly decreased plant yields and the amount of P taken up from the soil ; the addition of Ca salts resulted in only small reductions in these respects. It was thought that there was evidence that the formation of tricalcium phosphate or carbonate-apatite forms of P in soil, with a consequent rendering of the P present unavailable to plants, was not responsible for the low content of P in plants grown on saline soils, but that saline soils may cause large amounts of Cl and $SO_4$ ions to accumulate in the leaves, which can be prevented by applying P to the soil.—P.J.B.

1161 FRANCE. Société d'Encouragement de la Culture des Orges de Brasserie et des Houblons en France. Rapports sur la campagne 1952. [**Society for the Promotion of the Cultivation of Brewing Barley and Hops in France. Reports of the season 1952.**] [n.d.], pp. 75, illus. [Paris] [Received May, 1954]

INVESTIGATIONS REPORTED :—

1. Meteorological observations taken from areas where trials were conducted are published.
2. Records from the permanent experimental area of the Experiment Station at Maule give results of varietal trials, N-manuring of the varieties Aurore and Rika, and the effect of hormones and herbicides on the varieties Aurore and Isaria.
3. Records of trials in the experimental field of the National Agricultural School at Grignon are given.
4. In the regional trials, in various parts of France, the observation was made that fields sown between 13 and 17 March, i.e. before the spring rain, gave, on the whole, normal yields of barley with an acceptable chemical composition. April sowing was less dependable. Tabulated details of the vegetative growth and chemical composition of the varieties grown in all these regions are given in an appendix.
5. Quality of the barley of the 1952 harvest. The 3 varieties most generally grown for malting (Aurore, Isaria and René Guillemart) are only of average malting quality. Probstdorf and A. Busser are superior, having a higher carbohydrate- and a lower protein-content.
6. Results of malting trials on the laboratory and industrial scale are tabulated.—D.B.

## MAIZE

1162 CAMERY, M. P. and WEBER, C. R. **Effects of certain components of simulated hail injury on soyabeans and corn.** *Res. Bull. 400. Iowa agric. Exp. Sta.* 1953, 465-504, bibl. 6, illus.

The results are reported of 3 trials on maize in Iowa during 1949-50. Maize was defoliated to the extent of nil, 10, 25, 50, 75 and 100% at 4 growth stages, as follows : (a) 11-12 leaf stage, (b) 40% of plants in tassel, (c) silks 75% dry, and (d) ears in milk stage. Defoliation had the least effect when done at stage (d). Where 100% defoliation was carried out, grain yields of plants defoliated at stages (a), (c) and (d) were, 20, 20 and 47% of those of untreated controls. Plants 100% defoliated at stage (b) gave no yield. There were considerable differences between years in respect of response to defoliation, which were considered to be largely due to climatic factors. In 1949, 50, 75 and 100% defoliation at stage (d) resulted in yields 71·8, 60·7 and 34·7% of untreated controls, while in 1950, yields were 89·4, 77·7 and 60·9% of controls, respectively. At all growth stages, grain weights became smaller as the extent of defoliation increased. In a second trial, plants were completely defoliated at the following stages: (a) 4-5 leaf, (b) 8-10 leaf, (c) 11-12 leaf, (d) 14-15 leaf, (e) 40% of plants in tassel and (f) 15-20% of plants with silks dry. Mean grain yields during 1949-50, following the above treatments were: 96, 88·5, 55·3, 14·3, nil and 18·6 bu. per ac., respectively, compared with 97·1 bu. per ac. for controls. In a third trial, plant stands were reduced by nil, 10, 25 and 50%, with the plants subjected to nil, or 50% defoliation, at 3 growth stages as follows: 4-5 leaf, 7-8 leaf, 11-12 leaf and 40% of plants in tassel. Stand reductions of 50% lowered yields by about 30%, though there were considerable differences between the two years; yields were not further reduced by applying 50% defoliation at the 4-5 and 7-8 leaf stages. [See also Abs. 1229.]—P.J.B.

1163 VIEGAS, G. P. and others. Melhoramento do milho. 3. Ensaios de híbridos. [**Maize breeding. 3. Trials with hybrids.**] *Bragantia* 1952, **12,** No. 7-9, 247-58, bibl. 2, English summary p. 258. [Inst. Agron., Campinas, Brazil]

Comparative trials with yellow flint and yellow dent hybrid maize are being carried out. An account is given of the performance of the varieties tested. In general, maize imported directly from the USA did not yield well.—W.J.B.

1164 VIEGAS, G. P. Melhoramento do milho. 4. Comportamento regional de variedades e híbridos. [**Maize breeding. 4. Regional performance of open-pollinated and hybrid varieties.**] *Bragantia* 1952, **12,** No. 7-9, 259-66, bibl. 5, English summary p. 266. [Inst. Agron., Campinas, Brazil]

Local maize varieties and commercial hybrids were studied at 10 different localities in the state of São Paulo, Brazil, in 1948-51. The hybrids H.3531 and Agroceres gave the best yields on poor and rich soils, respectively. On the average H.3531 and Agroceres gave approx. 400 kg. per ha. more grain than the open-pollinated varieties Cateto and Armour.—W.J.B.

1165 JUGENHEIMER, R. W. and others. **Experimental corn [maize] hybrids tested in 1953.** *Bull. 572. Univ. Illinois agric. Exp. Sta.* 1954, pp. 23.

1166 CAPUTA, J. Observations sur la teneur en eau du maïs-grain en fonction de la date et de la densité des semis. [**The moisture content of maize grain as affected by the date of sowing and by seeding rate.**] *Rev. rom. Agric.* 1954, **10,** No. 3, 21. [Sta. Féd. Essais Agric., Lausanne]

In order to ascertain whether the moisture content of maize grain at harvest could be kept within suitable limits by cultural means, 2 varieties, Wisconsin 255 and Wisconsin 270, were sown in 1952 and 1953 in 2 localities on 4 dates ranging from mid-April to the beginning of June and in 8 densities ranging from 4 to 11 plants per sq. m. It was found that the sowing date can have a marked effect on the moisture content of the grain at harvest, and that early sowing is most advisable. Optimum planting density is 7-9 plants per sq. m. In choosing varieties, factors governing the date of sowing must be taken into account.—G.M.R.

1167 DELOUCHE, J. C. **Influence of moisture and temperature levels on the germination of corn, soyabeans and watermelons.** *Proc. Ass. off. Seed Anal. N. Amer. 1953* 117-26, bibl. 23. [Iowa State Coll., Ames]

The studies reported were made to determine favourable substrate moisture levels and temperatures for the germination of maize, soyabean and watermelon seed and to establish methods whereby suitable levels of moisture could be maintained during germination and which were reproducible. The seed was germinated in a standard seed-testing sand. Moisture contents in the sand ranged from 8-21%, expressed as the initial percentage of water in the sand on a dry-weight sand basis. Temperatures used were 16 hr. at 20°C. and 8 hr. at 30°C., where moisture contents were varied. Where temperatures were varied, that moisture content in the sand was used which was found most conducive to the germination of the crop in question. Temperatures used included constant 20, 25, 30 and 35°C., and alternating temperatures of 16 hr. at 20°C. and 8 hr. at 30°C., and 16 hr. at 30°C. and 8 hr. at 20°C. Both maize and soyabeans had the greatest germination percentages in the minimum space of time where the sand contained 15% moisture. The germination response of maize and soyabean seed was similar at all temperatures, except extremes; alternating temperatures of 20-30°C. and 30-20°C. and constant temperatures of 25 and 30°C. were essentially similar in their effect, though maximum germination in the minimum time occurred at temperatures of 30°C. Recommendations are given for measuring initial moisture contents in the substrate and for maintaining the moisture content in individual humidity chambers.—P.J.B.

1168 Sherf, A. F. **Correlation of germination data of corn and soyabean seed lots under laboratory, greenhouse, and field conditions.** *Proc. Ass. off. Seed Anal. N. Amer. 1953* 127-30, bibl. 10. [Iowa State Coll., Ames]

Maize and soyabean seed were germinated in the laboratory, seed treated with Arasan was germinated in steamed sand in the greenhouse, non-treated seed was germinated in the greenhouse in non-steamed sand, while further samples of treated and untreated seed were germinated in the field. Very close correlations were found between the germination percentages of treated seed sown in the field and that germinated in the laboratory. With soyabeans, mean germination percentages of seed germinated in the laboratory and of treated and untreated seed sown in the greenhouse and of treated and untreated seed sown in the field were : 83, 75, 49, 83 and 79, respectively ; with maize, respective figures were : 89, 91, 78 and 86, in which trials the series where untreated seed was germinated in the field was omitted. From these results, it was concluded that laboratory tests provided an accurate measure of the germination potential of maize and soyabean seed sown in favourable conditions in the field. From the results of the greenhouse trials, it was concluded that greenhouse conditions may not always provide results sufficiently valid to serve as a standard for comparison with laboratory tests.—P.J.B.

1169 Bryan, A. M. **Determination of moisture in seeds.** *Iowa State Coll. J. Sci.* 1954, **28,** No. 3, 286. [Abstr. Doct. Theses]

Studies were made of the moisture content of maize and soyabean seed by drying to constant weight in : air at 100°C., a vacuum oven at 70°C. and a vacuum desiccator at 25°C. The same moisture contents were obtained by drying in air at 100°C. for 12 days, and in a vacuum oven at 70°C. for 23 days. Seeds dried in vacuum at 25°C. were still losing weight after 60 days and still contained about 3% moisture, which is considered to be a minimum estimate of the amount of bound water in the seed. With constant weight after drying at 100°C. as a criterion, the Brown-Duvel moisture test gave reasonably concordant results, while the Tag-Heppenstall conduction method gave consistently low results, indicating standardization of the last method by relatively less rigorous methods than those of these tests. In drying tests on maize seed at 100, 110, 120 and 130°C., moisture-loss curves obtained indicated that the specific free-energy of moisture at the surface of the seeds decreased as the moisture content of the seed decreased. Experiments on weight changes in maize and soyabean seed stored in air of different relative humidities indicated that the rate of water loss or adsorption was greater in soyabean than in maize seed.—P.J.B.

1170 Sobrinho, J. de A. Produção de sementes híbridas de milho no estado de São Paulo. [**Production of maize hybrid seed in the State of São Paulo.**] *Bragantia* 1952, **12,** No. 7-9, 267-76, bibl. 4. English summary p. 275. [Inst. Agron., Campinas, Brazil]

An account is given of the system of producing and distributing hybrid seed. The Federal Government and the Instituto Agronômico combine to produce the seed. The average production of clean hybrid seed is 1500 kg. per ha.—W.J.B.

1171 Baldwin, R. E. and others. **Herbicide action. Absorption and translocation of carbon-14 applied as *O*-isopropyl *N*-phenyl carbamate in *Avena* and *Zea*.** *J. agric. fd Chem.* 1954, **2,** No. 8, 428-30, bibl. 4. [Oregon Agric. Exp. Sta., Corvallis]

The studies reported were made to determine the extent of absorption and translocation of *O*-isopropyl *N*-phenyl carbamate, containing $C^{14}$ as a tracer, by intact and cut leaves and roots of oats and maize. No IPC was absorbed by intact maize leaves and very little by intact oat leaves. Applications of IPC made to the cut leaves of oats resulted in translocation of IPC to the upper portions of the plants, and in the case of maize, to the entire plant system. IPC appeared to be more readily translocated by maize than by oat plants. Both intact and cut roots absorbed IPC, greater amounts being absorbed by cut than by intact roots. Cut leaves absorbed more IPC than cut roots. Absorption through roots was greater in maize than in oat plants. From these results, it is concluded that applications to the soil, or immediately after cutting, should give the best control of grasses.—P.J.B.

1172 Albert, W. B. **Comparative tests of several herbicides for pre-emergence application to corn.** *Proc. 6th South. Weed Conf. 1953* 126-33. [S. Carolina Agric. Exp. Sta., Clemson]

In trials at 2 locations in S. Carolina, the following herbicides were used in pre-emergence treatments to maize : Chlordane, 2,4-D amine, Dow H-1164 (2,4-dichlorophenoxy ethanol), MCPA (amine), Alanap (*N*-1-naphthylphthalamic) acid, Crag Herbicide 1 (Na 2,4-dichlorophenoxyethyl sulphate), Sesin, Crag 6036 [composition unspecified], CMU and Alanap 5. Chlordane was ineffective as a pre-emergence herbicide. MCPA gave satisfactory weed control, but caused injury to the maize. CMU at 1 lb. per ac. gave good weed control ; amounts of

2 lb. CMU per ac. gave excellent weed control, but injured the maize. The 2,4-D materials at rates of 1·5-2 lb. per ac. and Sesin, Crag 6036 and Crag Herbicide 1 at rates of 3 lb. per ac. all gave excellent weed control, with little injury to the crop. The most effective treatment was Sesin, the use of which resulted in significantly higher maize yields than where the other herbicides were used, and yields equal to those where conventional tillage practices were used. Alanap, applied at rates of 3 and 10 lb. per ac. was an effective herbicide, though applications of 5 and 10 lb. per ac. on sandy soil resulted in some crop damage. Mulching plots with residues from the previous crop (rye and vetch ; 3·5-4 tons dry matter per ac.) had no effect on the effectiveness of pre-emergence herbicides.—P.J.B.

1173 BOWDEN, J. **Crop protection problems in West Africa.** *Proc. 6th Symposium Colston Res. Soc. 1953. Insect. and Colon. agric. Devel.*, London, 1954, 85-91. [Dep. Agric. Kumasi, Gold Coast]

The control of insect pests in West Africa is discussed, with special reference to the Gold Coast. A 5% DDT dust, applied to maize 14-28 days after sowing, gave good control of the borers *Sesamia* sp. and *Busseola fusca* and gave a 250% increase in maize yield.—W.J.B.

1174 VIETS, F. G. and others. **Zinc deficiency in corn in Central Washington.** *Agron. J.* 1953, **45,** No. 11, 559-65, bibl. 22. [Irrigation Exp. Sta., Prosser, Washington]

Data are given of the composition of maize plants with symptoms of Zn-deficiency, grown on newly-irrigated soils in Central Washington. The Zn content of the tops of normal and Zn-deficient plants did not differ markedly at 3 sampling dates, while the contents of P and K were higher in the Zn-deficient plants. Differences between Zn-deficient and normal plants in respect of concentration of N, Ca, Mg and Mn were not large and were inconsistent, though the contents of these elements were somewhat higher in Zn-deficient plants. Plants with symptoms of Zn-deficiency contained 9, 9·3 and 17·4 ppm. Zn in the lower, middle and upper leaves, compared with 36·6, 31·2 and 66 ppm., respectively, in the leaves of apparently normal plants. In field trials, $ZnSO_4$ sprays did not increase maize grain yields where moderate to severe Zn-deficiency symptoms were visible, though vegetative growth was increased. Also, $ZnSO_4$ applied to the soil did not increase yields, though large amounts of Zn were absorbed by the plants. A concentration of 15 ppm. Zn in the leaf at the second node below the ear was regarded as adequate for grain yields of 100-125 bu. per ac. There was no evidence of a specific effect of Zn deficiency on the uptake of other elements. In the soil used, Zn-deficiency in maize was associated with total Zn concentrations in the soil of 60-70 ppm., and very low levels of Zn extractable by ammonium acetate-dithizone.—P.J.B.

1175 BONNETT, O. T. **The inflorescences of maize.** *Science* 1954, **120,** No. 3107, 77-87, bibl. 27, illus. [Univ. Illinois, Urbana]

Different aspects of the inflorescences of maize plants are considered, including comparisons of the inflorescences of maize with other grasses, the development of the maize plant in relation to the inflorescence, functional and developmental relationships in the ears and tassels, ear size and factors which affect it, the maize kernel, and factors which render maize a more productive grain producer than other cereals.—P.J.B.

1176 NICKERSON, N. H. **Morphological analysis of the maize ear.** *Amer. J. Bot.* 1954, **41,** No. 2, 87-92, bibl. 38, illus. [Dep. Bot., Univ. Massachusetts, Amherst]

In order to provide a sound basis for a study of variation in cobs of maize, the morphology of the female inflorescence has been re-investigated. This paper consists mainly of an analysis of the findings in published literature on the subject. The conclusion is reached that the maize cob is essentially a highly telescoped cauline axis which, during evolution, has been thickened both by vertical condensation and by adnation of the prophylls of its telescoped lateral shoots. The opinion has been confirmed by anatomical studies. [See also Abs. 437.]—D.B.

1177 TEAS, H. J. **B vitamins in starchy and sugary maize endosperms.** *Pl. Physiol.* 1954, **29,** No. 2, 190-4, bibl. 29. [Calif. Inst. Technol., Pasadena]

As a contribution to the problem of gene-action chemistry, the influence of the starchy-sugary alleles on the concentration of vitamins of the B group in maize endosperm was studied. Choline, $B_6$, riboflavin, inositol, niacin, biotin, pantothenic acid and thiamine were significantly higher in the sugary than in the starchy endosperms on a percentage basis but only the last 5 were higher on a per endosperm basis.—D.B.

1178 BLAKE, Clara. **Niacin metabolism in the corn [maize] seedling : The biosynthesis of trigonelline.** *Amer. J. Bot.* 1954, **41,** No. 3, 231-8, bibl. 14, illus. [Brooklyn College, Brooklyn, N.Y.]

1179 WARREN, F. S. and DIMMOCK, F. **The use of chemicals and of male sterility to control pollen production in corn.** *Canad. J. agric. Sci.* 1954, **34,** No. 1, 48-52, bibl. 13. [Cent. Exp. Fm, Ottawa]

Studies were made on the use of maleic hydrazide treatments and cytoplasmic male-sterility for controlling pollen production in maize. Spray applications of 0·025, 0·05 and 0·1% concentrations of maleic hydrazide were made when the plants were about 30 in. high in 1951, and when the plants ranged from 12 to 35 in. high in 1952. In no case was there any reduction in pollen production, or any effect on plant growth or subsequent maize yields.—P.J.B.

1180 PRINCE, A. B. **Effects of nitrogen fertilization, plant spacing, and variety on the protein composition of corn.** *Agron. J.* 1954, **46,** No. 4, 185-6, bibl. 2. [S. Carolina Agric. Exp. Sta., Clemson]

Data are given of the effect of 15, 55, 95 and 135 lb. per ac. applications of N and plant populations of 4, 7, 10 and 13 thousand per ac. on the crude protein, zein, leucine, isoleucine and tryptophane content of the grain and the amount of leucine, isoleucine and tryptophane per 100 g. grain protein, in the maize varieties Dixie 17 (white), N.C. 27 (yellow) and Douthit's Prolific (white), grown in S. Carolina. Increasing the rate of N treatment from 15 to 135 lb. per ac. increased the crude protein content from 7·81 to 9·53%, the zein content from 1·84 to 2·93%, the tryptophane content from 0·045 to 0·05% and the leucine content from 1·63 to 2·67%. The content of isoleucine was slightly reduced. The effect of increasing plant populations from 4 to 13 thousand was to decrease the protein content from 10·07 to 7·97%, the zein content from 2·94 to 1·97, the tryptophane content from 0·5 to 0·48% and the leucine content from 2·27 to 2·04. The effect on isoleucine content was irregular. These values are means for all varieties. The amounts of isoleucine produced appeared to be directly governed by the amount of N utilized by the plants. The varieties differed little in tryptophane, leucine and isoleucine contents, when these were expressed as percentages of the total protein. The contents of these amino acids on a whole grain basis showed that Douthit's Prolific had a slightly higher leucine and isoleucine content than the other varieties, and a proportionately lower tryptophane content.—P.J.B.

1181 ZUBER, M. S. and others. **Crude protein of corn grain and stover as influenced by different hybrids, plant populations, and nitrogen levels.** *Agron. J.* 1954, **46,** No. 6, 257-61, bibl. 5. [Missouri Agric. Exp. Sta., Columbia]

In trials during 1951-2 in Missouri on Putnam silt loam, a soil which normally releases 40-70 lb. N per ac. per year for maize production, the hybrid varieties US 13, Mo. 804 and Dixie 17 were grown at plant populations of (a) 8100-8400, (b) 10,097-11,741, (c) 13,349-14,757 and (d) 15,999-16,794 per ac. N treatments used were: nil, 50, 120 and 250 lb. N per ac., as ammonium nitrate. The 120 lb. N per ac. treatment was considered adequate to give yields of 100 bu. per ac. Mean yields of US 13, Mo 804 and Dixie 17 in 1951 were 97·6, 95·5 and 99·6 bu. per ac. and in 1952, 72·1, 54·7 and 75·1 bu. per ac., respectively. Mean yields where plant populations (a), (b), (c) and (d) were used were 87·2, 94·5, 106·3 and 104·6 bu. per ac. in 1951, and 69·9, 71·7, 66·9 and 62·6 bu. per ac. in 1952, respectively. Where N treatments were increased from nil to 250 lb. per ac., mean yields increased from 83·3 to 114·9 bu. per ac. in 1951 and from 42·2 to 91·4 bu. per ac. in 1952. The greatest yield increase occurred where the rate of N treatment was increased from 50 to 120 lb. N per ac. The mean content of protein in the shelled grain of the 3 hybrids varied from 8·23-8·53% in 1951 and 8·03-8·83% in 1952. As plant populations increased from (a) to (c), the protein content of the shelled grain decreased from 8·6 to 8·22% in 1951 and from 8·7 to 8·37 in 1952. Where nil, 50, 120 and 250 lb. N were applied, mean crude protein contents in the grain were 7·78, 7·25, 8·83 and 9·64 in 1951 and 7·28, 7·12, 9·19 and 10·27% in 1952, respectively. The mean crude protein yields per ac. for all varieties and plant populations were, in 1951, 360 lb. where no N was applied and 610 lb. where 250 lb. N were applied; in 1952, respective yields were 170 and 520 lb. per ac. In 1951, applications of nil and 250 lb. N per ac. increased the mean crude protein content of the stover from 2·07 to 4·68%; and, in 1952, from 2·91 to 6·52%. Where the total content of both grain and stover was considered, the effects of N treatments were much greater than where the effect on grain yield, alone, was considered. In 1951, 50 lb. N per ac. resulted in a total protein production of 423 lb. per ac.; while 250 lb. N per ac. produced 838 lb. protein per ac. From these results, it was stressed that crop yields, alone, are an insufficient basis for measuring the effects of N manures.—P.J B.

1182 COLLIER, J. W. **Effect of fertilizers applied with seed corn on plant population and yields on highly calcareous clay soils.** *Agron. J.* 1954, **46,** No. 3, 118-20. [Blackland Agric. Exp. Sta., Temple, Texas]

In 1950, identical manurial treatments were made to maize on Austin and Houston black clay in Texas. Treatments included: nil, 100, 200 and 300 lb. ammonium nitrate (32·5% N); nil, 150 and 300 lb. superphosphate (20% $P_2O_5$), and nil and 100 lb. muriate of potash (60% $K_2O$) per ac. These manures were applied in freshly-opened furrows on 15 March, the maize was sown at intervals of 18 in. along the same furrow and the manures + seed were covered by soil to a depth of 2-3 in. Ammonium nitrate caused highly significant reductions in plant stands on both soil types, the reductions having a linear relationship to the rate of ammonium nitrate applied. Muriate of potash also reduced plant populations, the reductions being significant on Houston black clay, only. Superphosphate had no significant effect on plant populations ; on Houston black clay it caused slight, but significant, increases in grain yield. Grain yields were progressively reduced as ammonium nitrate treatments increased. Muriate of potash had no significant effect on grain yields. Analyses of variance in plant populations showed very low mean squares for all treatment interactions. Reductions in stands following ammonium nitrate and muriate of potash treatments were apparently independent of each other, and additive. Average stands on Austin and Houston black clay were 87 and 65%, respectively. In a second series of trials on Austin black clay, manurial treatments applied in early December in the furrow included : nil, 130 and 260 lb. ammonium nitrate ; 200 and 400 lb. superphosphate, and nil and 100 lb. muriate of potash per ac. The land was re-bedded after treatment and maize sown on 15 March. Plant populations used were : 14,520, 9680, 7260 and 5810 plants per ac. Average grain yields following all ammonium nitrate treatments, where the above plant populations were used were : 50·1, 56·5, 56·6 and 55 bu. per ac. Manurial treatments caused no decreases in yields. From the results of these trials, it was concluded that applying manures with the seed causes yield reductions by lowering the vitality of the plants through excessive concentration of salts and only to a small extent by reducing plant populations.—P.J.B.

1183 Foy, C. D. and others. **Foliar feeding of corn with urea nitrogen.** *Proc. Amer. Soc. Soil Sci.* 1953, **17,** No. 4, 387-90, bibl. 12, illus. [Purdue Univ. Agric. Exp. Sta. Lafayette, Ind.]

The trials reported were made : (a) to compare the efficiency of N applied as urea foliage-sprays and as soil dressings and (b) to determine the cause of foliar injury caused by urea foliar sprays. In field trials on soils on which a response to N by maize could be expected, the following N treatments were made to maize : 20 and 40 lb. N per ac. as $NH_3NO_3$ side-dressed, 20 and 40 lb. N per ac. as a foliar spray of 50 lb. urea per 100 gal. water and 20 and 40 lb. N per ac. as a foliar spray of 200 lb. urea per 100 gal. water. Efforts were made to prevent the foliar sprays reaching the soil. All foliar sprays caused leaf injury, though the 50 lb. urea per 100 gal. water concentration caused only slight leaf burn. There were no grain-yield differences between the 20 lb. $NH_4NO_3$ and the 20 lb. N per ac. dilute foliar spray treatment. At the 40 lb. N per ac. rate, both low and high concentration foliar sprays were less effective than the soil treatment, owing to leaf burn. Data are given of the effect of urea-spray concentration on the rate of urea absorption by maize plants. To determine the cause of leaf injury, spray treatments used were : urea + potassium bicarbonate, urea + sucrose and urea alone. The maize leaves were analyzed for urea, ammonium nitrates and reducing sugars. From the results of these determinations, it was thought that urea spray injury may be due to a product of ammonium metabolism. The use of sucrose + urea, the application of small amounts of N at given times and the use of low concentrations of urea all reduced foliar spray injury.—P.J.B.

1184 Wittels, H. and Seatz, L. F. **Effect of potash fertilization on yield, stalk breakage and mineral composition of corn.** *Proc. Amer. Soc. Soil Sci.* 1953, **17,** No. 4, 369-74, bibl. 2. [Tennessee Agric. Exp. Sta., Knoxville]

The trials reported were carried out using a maize hybrid known to be susceptible to stalk breakage, grown on Staser fine sandy loam with an exchangeable K content of 60 lb. per ac. Applications of up to 200 lb. $K_2O$ were applied, in combination with 60 or 120 lb. N per ac. Where 120 lb. N was applied, the only K treatment resulting in significantly higher grain yields than controls receiving no K, was 40 lb. $K_2O$ applied at sowing time. Where 60 lb. N per ac. was applied, the only K treatments which significantly raised yields over those of controls were 20 lb. $K_2O$ per ac. applied at sowing time, and 80 lb. $K_2O$ at sowing time + 120 lb. $K_2O$ per ac. applied by deep placement (6 in. deep) at sowing time. K reduced stalk breakage at the 120 lb. N, but not at the 40 lb. N per ac. treatment. Applications of up to 40 lb. $K_2O$ + 120 lb. N per ac. reduced stalk breakage ; rates above 40 lb. $K_2O$ per ac. had no further effect on stalk breakage. Where 40 lb. N per ac. was applied, stalk breakage was not greatly affected by any K treatment. Data are given of the K and Ca contents of the stalks and leaves of the plants.—P.J.B.

1185 Munro, J. W. **Losses caused by insects in crops during storage and transit.** *Proc. 6th Symposium Colston Res. Soc. 1953. Insect. and Colon. agric. Devel.* London, 1954, 103-15. [Imp. Coll. Sci. Tech., Silwood Park, Sunninghill, Berks]

The problems involved in the control of insect pests of stored crops in colonial territories are outlined. It is pointed out that in certain tropical countries, such as Northern Rhodesia, maize crops become infested with the weevil *Calandra* and the moth *Sitotroga* even before they are removed from the fields. The points at which pest control measures need to be applied are : the field, village stores, transport vehicles and warehouses. Control measures taken against insect pests of stored crops in various colonial territories are described and discussed. *Trigoderma* was successfully controlled in the groundnut stacks at Kano, Northern Nigeria, by means of methyl bromide fumigation under sheeting. In Tanganyika, the most economical form of storage was found to be in underground pits lined with concrete and faced with bitumastic material. The rice weevil was eliminated from stored grain in these pits. The question of the possible contamination of foodstuffs by DDT and BHC was discussed. As a result of experiments, the Toxicology Committee of the Medical Research Council considered that the contamination of foodstuffs with up to 2·5 ppm. gamma-BHC would not endanger human health. Results of research with DDT were less definite, but a provisional limit for DDT contamination of 7 ppm. is recommended. In the USA it is forbidden to sell grain treated with BHC or DDT for human consumption.—W.J.B.

1186 SALMOND, K. F. **Fumigation of maize with methyl bromide.** *Nyasald Fmr For.* 1954, **1,** No. 4, 39-44.

The practical methods used for the fumigation, with methyl bromide, of maize stored by the Produce Marketing Board, Nyasaland, are described. On the average, the percentage of grains damaged by insects was less than 3% in the treated grain 3 months after treatment.—W.J.B.

1187 SIEBEN, J. W. Het gebruik van nomogrammen ter vereenvoudiging van berekeningen. [**The use of nomograms for simplifying calculations.**] *Euphytica* 1954, **3,** No. 1, 64-7, bibl. 1, illus. [Stichting voor Plantenveredeling, Wageningen, Netherlands]

Details are given of the use of a nomograph for computing the yield of maize on a basis of 15·5% moisture content, where the weight of maize ears, the weight of dry seed threshed from the ears, and the dry-matter content of the seed is known. —P.J.B.

1188 UNITED STATES. Hybrid Corn Industry. **Report of Eighth Research Conference 1953.** *Publ. 8. Hybrid Corn Industr.* [n.d.], pp. 106.

Among papers read at this Conference were :

1. Progress report on male sterility. By D. F. Jones, pp. 7-10.
2. Sources of germ plasm for hybrid corn. By W. L. Brown, pp. 11-16.
3. Chemical weed control in corn and the use of chemical desiccants. By F. W. Slife, pp. 31-5.
4. Maximum stands for maximum production. By C. O. Rost, pp. 48-53.
5. Cold test germinations. By E. H. Rinke, pp. 54-8, bibl. 5.
6. Maturity in relation to seedling vigour. By H. E. Kaerwer, pp. 59-68, bibl. 7. Observations are made on the effect of variations in the harvesting and processing of maize on seed-coat damage, and on the effect of differences in maturity at harvest on the germination of seed under cold-test conditions.
7. Seed treatments. By M. B. Moore, pp. 69-75.
8. Treatments for soil insects. By J. H. Lilly, pp. 76-92, bibl. 36.—P.J.B.

## SWEET-CORN

1189 HASKELL, G. **Adaptation of sweet corn to English climatic, edaphic and biotic factors.** *Pl. and Soil* 1954, **5,** No. 2, 170-81, bibl. 21, illus. [John Innes Hort. Inst., Hertford, England]

A review is given of problems of adaptation, and the diseases and pests attacking N. American inbred, hybrid and open-pollinated sweet-corn in Britain. Particular reference is made to pathogens attacking embryos and seedlings under adverse conditions for germination, smut (*Ustilago zeae*), frit fly (*Oscinella frit*), wireworms, mice and birds. Methods of control, both genetical and practical, are outlined.—P.J.B.

1190 CLARK, B. E. **Relationship between certain laboratory tests and the field germination of sweet corn.** *Proc. Ass. off. Seed Anal. N. Amer. 1953* 42-4. [New York State Agric. Exp. Sta., Geneva]

Samples of sweet-corn seed, representing 30 varieties and hybrids, were subjected to the following germination tests : standardized laboratory test in rolled towels, and cold tests in rolled towels, sand + peat moss and in sterilized and non-sterilized soil. Comparisons were made between the germination percentages obtained by these means and in field tests, in which the seed was sown by hand in a clay-loam soil, on 1 May, 1951, 2 May, 1952 and 10 July, 1952. In the standardized tests in towels, germination percentages averaged 93, while average percentages in the cold tests in rolled towels, sand + peat moss, sterilized soil and non-sterilized soil were 89, 79, 80 and 54, respectively. Germination percentages in the field tests were 58, 65 and 80 for the sowings made on 1 May, 1951, 2 May, 1952 and 10 July, 1952. From calculations of correlation coefficients, it was concluded that cold tests in non-sterilized soil gave the most accurate forecast of field emergence of sweet-corn following sowing in early May, but not 10 July, while the standard towel test gave a poor forecast of germination in the field following early May sowings, but gave a good forecast of germination for sowings on 10 July. The seed used in these studies was of high quality.—P.J.B.

1191 Howe, R. G. and Davis, A. C. **Corn earworm control on Long Island.** *J. econ. Ent.* 1954, **47,** No. 1, 94-7, bibl. 1. [New York State Agric. Exp. Sta., Geneva]

Four 5% DDT dusts applied at 3-day intervals and 5 dusts applied at 2-day intervals gave good and equal control of the earworm (*Heliothis armigera*) on sweet-corn. One % Parathion dusts gave similar results. DDT and mineral oil sprays (3 quarts of 25% emulsion) gave results about equal to dusting at the same time-intervals.—From authors' summary.

## MILLET AND SORGHUM

1192 Webster, J. E. and others. **Yield and composition of sorghum juice in relation to time of harvest in Oklahoma.** *Agron. J.* 1954, **46** No. 4, 157-60, bibl. 9. [Oklahoma Agric. Exp. Sta., Stillwater]

Three years' data are given of the density of the sugar (in degrees Brix), titratable acidity, ash and N content, content of reducing sugars and sucrose, total sugar content of the juice of the sorghum variety Honey, together with data of the percentage juice from the cane, lb. sugar per ac. and ratio of reducing sugars to sucrose. Harvesting dates for the sorghum ranged from 21 August to 9 November, i.e., from the time the plants had reached the soft dough stage, to the first killing frost. Summarized data are also given for the varieties Colman Y, Gooseneck O.C., Leoti, Red X, Sugar Drip, Sumac 1712 and White African. As the sorghum progressed towards harvest, the solid content of the juice increased irregularly, until near the end of the season, when a slight drop occurred. Titratable acidity values also increased, often doubling, or tripling, before the end of the season. Total sugar content in the juice reached a maximum value, which changed little as the season progressed. The percentage yield of juice from the cane almost invariably declined as the season progressed, a factor chiefly responsible for reductions in syrup yields where the crop is allowed to stand until the first killing frost. In these trials, sugar yields normally declined after the period 1-15 September. Sumac 1712 and White African could produce high sugar yields if rain falls after this date.—P.J.B.

1193 Seed World. **Combine Sagrain, new sorghum is released for southern Alabama.** *Seed World* 1954, **74,** No. 11, 90, illus.

Combine Sagrain is a selection from the Schrock Kafir variety, and is resistant to lodging and to bird damage—probably by virtue of its loosely-branched head. It is adapted to southern Alabama, where it has, in most cases, significantly outyielded Early Hegari and Martin Combine.—P.J.B.

1194 Franzke, C. J. **Reliance, early grain sorghum looks promising for South Dakota growing conditions.** *Seed World* 1954, **74,** No. 12, 10-11, illus. [S. Dakota Agric. Exp. Sta., Brookings]

Reliance was derived from a Modoc × Sooner Milo cross and is adapted to S. Dakota. It is more stiff-strawed than Norghum, and, in trials, has stood up longer than Norghum following killing frosts. Reliance has an open-seeded panicle, borne well above the flag leaf. It is similar to Norghum in its time of maturation. The yields of Reliance have compared very well with those of Norghum ; following early May sowings, it has been outyielded by Norghum, while following sowings at the optimum date, it has outyielded Norghum.—P.J.B.

1195 † Tarr, S. A. J. **Control of cockchafer grubs by seed treatment.** *Nature, Lond.* 1954, **173,** No. 4413, 1052. [Gezira Res. Fm, Wad Medani, Sudan]

In the Sudan Gezira, white grubs of the genus *Schizonycha* attack young roots of *Sorghum vulgare.* Older plants with established root systems are less commonly attacked. Use of powdered seed-dressings containing a fungicide (thiram or organo-mercuric) and 20-40% by weight of gamma benzene hexachloride (BHC) gives almost complete protection. The dressing is used at the application rate of 1 g. per lb. of seed, with a sowing rate of 10 lb. seed/ac., giving the small dosage of about 3 g. of BHC/ac. in the case of 20% BHC dressings.—M.H.

1196 † Varenica, E. T. [***Setaria italica,* P.B. *maxima,* Alf.** **(agrobiological features).**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 2, 73-82, bibl. 7, illus.

A study of this crop made in the Ukraine, in the central chernozem and non-chernozem belt of USSR, has shown that the plant has a high degree of " biological plasticity." It grows in warm, moist climates as well as in rather cold and dry districts. It tolerates drought well, having strong roots which penetrate to the moisture-holding layers of soil, and it survives morning frosts of —2 or —3°C. The species is a short-day type, most varieties being characterized by a short vernalization stage (2-3 days), although in some forms the phase may be prolonged to 5-6 days. The crop can be grown on most types of soil, being less exacting in its soil requirements than are wheat, barley or millet. It is valuable in USSR as a grain crop, as hay or for its high yields of green matter for silage.—M.H.

## RICE

1197 Goor, G. A. W. van de. **Effect of age of seedlings on the yield of rice.** *Landbouw Djakarta*

1953, **25,** No. 7-12, 247-54, bibl. 2, illus. [Agric. Res. Sta., Bogor, Indonesia]

Seedlings of the early-maturing variety Mas and the mid-late maturing varieties Gedangan and Bengawan were transplanted at ages ranging from 5-55 days after sowing. In the case of the early-maturing variety, the highest yields of grain were obtained when seedlings were transplanted at 25 days after sowing. The percentage of sterile seeds increased with increasing age of transplants beyond 25 days. The varieties Gedangan and Bengawan gave the highest yields when transplants 30-35 and 35 days old, respectively, were used.—W.J.B.

1198 ANSORENA, A. de. Las variedades de arroz cultivadas en España y los trabajos de la Estacion Arrocera de Sueca, hasta el año 1952. [**The varieties of rice cultivated in Spain and the rice-breeding work carried out at the Rice Experimental Station, Sueca, up to 1952.**] *An. Inst. nac. Invest. agron.* 1954, **3,** No. 2, 89-291, bibl. 16, illus. [Rice Exp. Sta., Sueca, Spain]

The history of rice-breeding in Spain is briefly outlined and the breeding and multiplication work in progress at the Station in 1952 is described in detail. The characteristics of the principal varieties in use or still under trial in Spain are described. Five varieties (either acclimatized, selected or bred at the Station), Colusa × Nano, Balilla, Precoz verde, Benlloch and Americano 1600, occupy 95% of the area under rice in Spain. All five varieties mature in about 163-6 days. Two relatively new varieties bred or improved at the Station, Beltrán and Stirpe 136, are recommended for use in the Ebro and Valencia areas, respectively. Tables are given of varieties under observation listed as "Imported from abroad," "Selections of native varieties" and "Hybrids bred at the Station." Each table includes notes on morphology and performance.—W.J.B.

1199 JONES, J. W. and others. **Rice varieties and their yields in the United States 1939-50.** *Circ. 915. U.S. Dep. Agric.* 1953, pp. 28, bibl. 16.

Descriptions are given of the short-grain varieties Colusa, Onsen, Acadia, Caloro, Asahi and Cody, the medium-grain varieties Blue Rose, Early Prolific, Zenith, Calady 40, Arkrose, Kamrose, Magnolia, Calrose and Lacrosse, and the long-grain varieties Fortuna, Lady Wright, Rexoro, Nira, Texas Patna, Delrex, R-D, Prelude, Bluebonnet, RN (Rexoro-Nira), Rexark and Century Patna. Data are given of the yields of these varieties in the principal rice-growing States of the USA.—P.J.B.

1200 CADA, E. **A comparative study of the agronomic merits and milling characteristics of different upland rice varieties.** *Philipp. J. Agric.* 1952, **17,** No. 1-4, 23-51, bibl. 4.

The studies reported were carried out in the Pangasinan Province of the Philippines during 1948-50, using 5 early-maturing, 10 late-maturing and 5 glutinous rice varieties. Data are given of: the tillering capacity, yields, reaction to weather conditions, time taken to mature, grain shattering, lodging, resistance to rice stem-borer, and the milling characteristics of the varieties.—P.J.B.

1201 REYES, G. M. **The rice blast and its sporadic occurrence in the Philippines.** *Philipp. J. Agric.* 1952, **17,** No. 1-4, 1-19, illus.

Notes are given on the relative susceptibility to *Piricularia oryzae* of certain rice varieties grown in the Philippines, and on measures to control the disease.—P.J.B.

1202 LEE, SUNG-YANG. **Effect of calcium cyanamide on the rice borer.** *J. econ. Ent.* 1954, **47,** No. 1, 186-7. [Taiwan Agric. Res. Inst., Taipei, Formosa]

Plot trials showed that calcium cyanamide, when applied to fresh rice stubbles on moist soil, was effective against rice borer (*Schoenobius incertellus*) larvae overwintering in the subterranean part of the culms. The insects seemed to be killed not only through decay of the stubble but also by the action of calcium cyanamide as a fumigant. A dose of 0·5 g. was as effective on stubble cut at the surface of the soil, as 1-2 g. applied to stubble 6-18 cm. high, a dose of 2 g. being equivalent to approximately 180 kg. per ac.—E.B.O.

1203 VECHT, J. van der. **The problem of the mentek disease of rice in Java.** *Landbouw Djakarta* 1953, **25,** No. 1-6, 45-130, bibl. 120, illus. [Fac. Agric., Bogor, Indonesia]

The history of the mentek disease of rice in Indonesia is reviewed and the geographical distribution of the disease is described. The literature on the symptoms of mentek disease and the environmental factors which favour its development, is summarized. [See also Abs. 833.]—W.J.B.

1204 VELASCO, J. R. and others. **Effect of time of applying ammonium sulfate on growth and yield of rice.** *Philipp. Agriculturist* 1953, **36,** No. 10, 454-73, bibl. 2. [Philippine Cent. Agric. Exp. Sta., Laguna]

Pot experiments were carried out, using the upland variety Inintiw and the lowland variety Elon Elon, to determine the effect of ammonium sulphate at different growth stages on the tillering, plant height and grain yield of rice. From the results, it was apparent that N treatments had their greatest effect in increasing tiller production when made at the seedling stage, when tillers were being actively produced. N treatments made during the middle of the vegetative growth stage were effective in preventing the drying-out of tillers, while N treatments made at the late vegetative, or early reproductive-growth stages, were effective in increasing panicle size and grain weight. These 3 stages occurred when Elon Elon was up to 40 days, about 60 days and at 100 days old, respectively. With Inintiw, respective ages were up to 30 days, about 60 days and about 80 days old. The highest grain to straw ratios were secured by N treatments made at the early reproductive growth stage in the case of both varieties.—P.J.B.

1205 CHANG, S. C. and others. **A study on the relative availability of ammonium sulphate, ammonium chloride, ammonium nitrate and urea to rice.** [Chinese] *Agric. Res., Taiwan* 1953, **4,** No. 2, 1-41, bibl. 13, English summary pp. 40-1. [Taiwan Agric. Res. Inst., Formosa]

N was applied in 4 different forms to first and second rice crops at levels of nil, 40, 80 and 120 kg. N per ha. in experiments at 10 different localities in Formosa. The best response in grain yields to unit applications of N at all levels was obtained by using ammonium sulphate, with the exception of the first crop at the 120 kg. N level which responded best to ammonium chloride. The first crop yielded, on an average, 20 kg. per ha. more grain in response to the application of 1 kg. per ha. N as ammonium sulphate at the 80 kg. per ha. level ; the equivalent response for the second crop was 9 kg. grain per ha. Representing the availability of N in ammonium sulphate to the grain at the 80 kg. N level as 100 in the case of both the first and second crops the availability of N in ammonium chloride, urea and ammonium nitrate, respectively, was 92, 84 and 57 for the first crop and 98, 89 and 66 for the second crop.—W.J.B.

1206 LIN, J. F. and CHEN, C. T. **A study on the top-dressing of nitrogenous fertilizers to rice.** [Chinese] *Bull. 9. Taiwan agric. Res. Inst.* 1952, pp. 31, bibl. 30, illus., English summary pp. 15-16.

Experiments in 1947-52 to determine the effect of the type of nitrogenous manure used and the rate of its application on the yields of rice, are described. Two crops of rice per year were grown. Ammonium sulphate gave a better response than calcium cyanamide or ammonium nitrate when applied to the first crop ; when applied to the second crop there was little difference in the responses to the three different manures. Dividing the dressing of ammonium sulphate or ammonium nitrate in half and applying one-half as a normal dressing and the other as a top-dressing gave better yields than applying the whole at the normal time ; no advantage was gained by applying half the calcium cyanamide as a top-dressing. Top-dressings of ammonium sulphate were applied 5, 15, 30, 45 and 60 days after transplanting rice seedlings ; the highest yields were obtained by applications at 60 and 30 days after transplanting in the case of first and second crops, respectively.—W.J.B.

1207 CHANG, S. C. and TSENG, H. D. **A study on the fertilizer requirement of rice in Taiwan.** [Chinese] *Agric. Res., Taiwan* 1953, **4,** No. 1, 13-57, bibl. 8, English summary pp. 54-7. [Taiwan Agric. Res. Inst., Formosa]

Experiments were carried out at 15 localities in 1949-50 to determine the effect on yields of rice grain and straw of applications of N (nil and 80 kg. per ha.), P (nil and 80 kg. $P_2O_5$ per ha.) and K (nil and 80 kg. $K_2O$ per ha.) on the following 3 different types of soil : sandstone and shale alluvial soils, lateritic soils, and slate alluvial soils. Two rice crops per year were grown. The application of 80 kg. N per ha. gave average increases in yield, compared with no N, of 80% for the first crop (varying from 59% on lateritic soils to 105% on slate alluvial soils) and 35% for the second crop. The highest increase obtained by the application of 80 kg. $K_2O$ per ha. was 13% on shale alluvial soils. The response to P applications was slight.—W.J.B.

1208 CHIU, T. F. **The effect of vanadium application on the paddy rice.** [Chinese] *Agric. Res., Taiwan* 1953, **4,** No. 2, 48-59, bibl. 25, illus., English summary p. 59. [Taiwan Agric. Res. Inst., Formosa]

In pot experiments, the application of 150 ppm. $V_2O_3$ as sodium vanadate to soil in which rice was sown gave increases in the height, root length and weight of rice seedlings. The N content of the seedlings was generally increased with increasing quantities of sodium vanadate applied. When the seedlings were transplanted to a manured rice-field to which no vanadium was applied their subsequent growth and yield was not superior to that of seedlings which had not received vanadium treatment.—W.J.B.

1209 FORNACI, C. Segreti delle acque da risaia. [**Irrigation water of rice-fields (in Italy**).] *Riso* 1954, **3,** No. 5, 6-10, illus.

An investigation was initiated by the Ente Nazionale Risi, in 1953, to study the composition of water derived from rivers, torrents and springs, and sometimes incorporating sewer water, used for irrigating rice-fields. The first results from this study from Mortara district, Lombardy, are given. —E.B.O.

1210 INDIA. Central Rice Research Institute, Cuttack. **Annual Report for 1951-52.** 1954, pp. 32. [Orissa]

INVESTIGATIONS REPORTED :

1. Methods of applying ammonium sulphate to rice crops, p. 3. Ammonium sulphate at 20 and 40 lb. per ac. was applied deep to the dry soil before transplanting and on the surface of the wet soil after transplanting. As in the previous two years the former method gave much better yields than the latter.

2. Seed soaking in nutrient solution, pp. 16-17. Soaking rice seed in 10% solution of $K_2HPO_4$ gave a yield increase of 9·6% over no treatment. Seed treatment with concentrated ammonium sulphate solution (leaving a coating of the fertilizer on the seed) gave a yield increase of 7% over no treatment.

3. The effect on rice yields of applications of copper sulphate to the soil, pp. 18-19. Applications of 10 and 20 lb. copper sulphate gave significant yield increases of 32 and 36%, respectively, over control (no treatment with copper sulphate).

4. Control of blast in rice by advancing the date of transplanting and by application of fungicides, pp. 23-5. The intensity of foliar and neck infection was highest in the plants which were youngest at the time of attack by blast. Advancing the date of transplanting from mid-August to the first week in July reduced the incidence of the disease and significantly increased yields of grain. Bordeaux mixture and Perenox both gave control of the disease. Spraying with Bordeaux mixture (5 : 5 : 50) four times during the growth of the crop reduced neck infection from 30 to 18% and increased yields by 55% compared with unsprayed plots.—W.J.B.

## GENERAL

1211 GREAT BRITAIN. National Institute of Agricultural Botany. **Summary of the recommended lists of cereals for 1954.** *Fmrs' Leafl. 1. N.I.A.B.* 1954, pp. 2.

1212 GREAT BRITAIN. National Institute of Agricultural Botany. **Growing cereals for seed.** *Seed Growers' Leafl. 14. N.I.A.B.* [n.d.], pp. 3.

1213 AGRICULTURAL MERCHANT. **The cereal seed inspection scheme [England and Wales].** *Agric. Merch.* 1954, **34,** No. 6, 225-7, illus.

This history of the scheme, begun in 1947, is traced and its objectives and working described.—C.L.S.

1214 GADD, I. **Report of the Biochemical and Seedling Vigour Test Committe.** *Proc. int. Seed Test. Ass.* 1953, **18,** No. 2, 289-306. [Swedish State Seed Test. Sta., Stockholm]

Data are given of the germination in sand, on filter paper and in brick dust ; field emergence and viability as indicated by the tetrazolium test, of samples of cereal, pea and bean seed, both untreated and treated with fungicides. The determinations were made at 6 different locations in Europe and in Ottawa and the results are critically compared. Average germination percentages of cereals in sand and filter paper were 75 and 74, respectively, which showed the agreement between these two methods. Tests of seed vigour in brick dust gave an average value of 72%. With sound, uninjured cereal seed, the tetrazolium test gave results which were a reliable index of germination. With cereal seed damaged by seed-borne diseases, or overdoses of fungicidal seed dressings, the use of the tetrazolium method was completely unreliable for assessing the germinating capacity of the seed. —P.J.B.

1215 ZOGG, H. Nachweis der Fernwirkung von Getreidebeizmitteln. **[Testing the distance effect of cereal [seed] disinfectants.]** *Mitt. schweiz. Landw.* 1954, **2,** No. 5, 96-9. [Eidg. Landw. Versuchsanst., Zürich-Oerlikon, Switzerland]

1216 GRUBER, F. Die praktische Anwendung von Dicopur im Getreidebau. **[The use of Dicopur in the growing of cereals.]** *Ber. Arbtag., Admont 1953* 33-41, bibl. 2.

Information is given on the optimal use of Dicopur for the control of weeds in cereals, the quantity and concentrations of the spray, the stage of development of cereal and weeds and desirable environmental and weather conditions. The economic value of the treatment has been proved in trials, average crop increases of 300-500 kg. per hectare having been obtained.—G.M.R.

1217 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Frit fly [*Oscinella frit*].** *Adv. Leafl. 110. England and Wales. Minist. Agric. Fish.* 1954, pp. 5.

1218 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Stem and bulb eelworm [*Ditylenchus dipsaci*] on cereals and other farm crops.** *Adv. Leafl. 178. England and Wales. Minist. Agric. Fish.* 1954, pp. 6.

1219† ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Cereal root eelworm [*Heterodera major*].** *Adv. Leafl. 421. England and Wales. Minist. Agric. Fish.* 1954, pp. 4.

1220 GFELLER, F. and GOULDEN, C. H. **The effect of the intensity of artificial light on the growth of cereals.** *Canad. J. Bot.* 1954, **32,** No. 2, 318-19, illus. [Cereal Crops Div., Exp. Fms Serv., Dep. Agric., Ottawa]

In one experiment, Larain oats and Saunders wheat were grown in light intensities of 300, 800 and 1200 candle power, as measured at crop level and 2 ft. from the lights. In a second experiment, Larain oats, Saunders wheat and Montcalm barley were grown in light intensities of 500, 1000 and 1500 candle power. The light source was fluorescent tubes, supplemented with incandescent bulbs. The temperature in the trials ranged from 73-76°F. Full light was used for 18 hr., followed by low-intensity incandescent light, only, for the remaining 6 hr. of the day. Data are given of the number of heads produced, seeds set per head, and percentage fertility. At the highest light intensity used, Saunders wheat and Montcalm barley approached the maximum possible percentage fertility per head. There was evidence that the fertility of Larain oats (69·4% at 1200-1500 candle power) could have been still further improved by increased light intensity, though growth and seed production were normal at this level of light intensity. The time from sowing to heading was about 30 days for all varieties, though low light intensities extended this by about 7 days.—P.J.B.

1221 † NIGGEMANN, J. Über die physiologischen Ursachen der Erhöhung des Getreide-Saatgutwertes durch überhöhte und späte Stickstoffgaben. [**The physiological causes underlying the improvement in quality of cereal grain by heavy and late nitrogen manuring.**] *Saatgutwirtschaft* 1954, **6,** No. 5, 122-3, bibl. 45.

This is a literature review, summarizing, the effects of heavy (additional) applications of N-fertilizer after leaf development and immediately before flowering. When applied at this stage the N-fertilizer nourishes the reproductive organs. The reason given (and supported by references to literature) is that the fresh supplies of enzymes, vitamins and hormones elaborated in the assimilating tissues as a result of late manuring are, at this stage, translocated to the grain.—D.B.

1222 CROWTHER, E. M. **Cereals, late nitrogen experiments.** *Rep. Rothamst. exp. Sta. 1953* Harpenden, 1954, 144-5.

The results for 1953 of an experiment, begun in 1950, to determine the effect of late dressings of nitro-chalk (applied when the crops were in ear, at rates of 1·5 and 3 cwt. per ac.) on the yields of grain and crude protein of wheat, barley and oats, are reported. Heavier summer rainfall in 1953 permitted better utilization of late N by the crops than was the case in 1952 [see Abs. 332 for the results in that year]. Barley, but not wheat and oats, showed a considerable and significant gain in grain, straw and crude protein yields as a result of the application of 1·5 and 3 cwt. per ac. nitro-chalk in late June. In the case of barley (grain and straw) there was a gain of 0·68 and 1·31 cwt. per ac. of crude protein from the single and double dressings, respectively, compared with no dressing. The recovery of N from the double dressings by barley, oats and wheat, respectively, was 45%, 14% and 4%. Oats, in contrast to barley, tended to accumulate N in the straw rather than in the grain.—W.J.B.

1223 PENNER, E. **The effect of $P^{32}$ radiation on crop growth and phosphorus uptake.** *Canad. J. agric. Sci.* 1954, **34,** No. 1, 41-7, bibl. 14. [Soil Sci. Dep., Univ. Saskatchewan, Saskatoon]

Experiments were made to determine the effect on the P uptake and growth of wheat grown in nutrient solutions containing nil, 12, 120 and 1200 microcuries of $P^{32}$ per g. of $P^{31}$, on the P uptake and growth of wheat grown in the greenhouse on soil receiving nil, 12, 120, 60, 1200 and 6000 microcuries of $P^{32}$ per g. $P^{31}$ applied in granular form, and on the P uptake and growth of wheat, barley, oats and rye grown on soil receiving nil, 8, 80, 800, 2400 and 4000 microcuries of $P^{32}$ per g. $P^{31}$ in granular form. The P was applied in the form of $NH_4H_2PO_4$. Applications of as little as 12 microcuries of $P^{32}$ resulted in deviations of plant weight and amount of P absorbed, compared with controls receiving no $P^{32}$. Applying $P^{32}$ in granular form had no significant effect on plant weight or P uptake. With oats and barley, the application of 8 and 80 microcuries $P^{32}$, respectively, resulted in a reduction in the uptake of soil P. Only in respect of uptake of soil P were there any significant differences in response to $P^{32}$ between the 4 crops used. It was concluded that the use of $P^{32}$ in granular manures was unlikely to cause radiation effects of sufficient magnitude to invalidate its use as a tracer in manurial studies.—P.J.B.

1224 † ENGLAND AND WALES. Ministry of Agriculture and Fisheries. National Advisory Service. **Combine harvesters.** *Fm Mach. Leafl. 3. N.A.A.S.* 1953, pp. 7.

1225 CULPIN, C. **The care of combined grain.** *Fmg Topics 2. N.A.A.S.* 1953, pp. 2. [England and Wales. Minist. Agric. Fish.]

1226 WARNER, J. L. **Protection of stored grain with 'Pybuthrin' insecticides.** *World Crops* 1954, **6,** No. 6, 251-2, illus. [Cooper, McDougall and Robertson, Ltd.]

The use of Pybuthrin to protect clean, uninfested cereal grain from insect attack, is described. Pybuthrin is a mixture of pyrethrins and piperonyl butoxide, a synergist which increases the lethal action of the pyrethrins. Compared with pyrethrum insecticides, Pybuthrin is relatively non-poisonous to human beings and taints the grain less ; it can be applied as a spray, mist or powder and is available in various formulations. A protective coating of Pybuthrin dust is applied to the interior of grain stores and bins before filling. Sprays can be used as mists against flying moths or as a surface spray over the grain to give it a protective coating against beetles, moths and their larvae; Pybuthrin Insecticide No. 44 is used at a rate of 1 gal. per 1000 sq. ft. for the latter purpose. The insecticide is especially useful against the cacao moth, *Ephestia elutella*. In Britain it is necessary to repeat surface sprayings at intervals of 4-5 weeks from May to late October. Pybuthrin Grain Protectant (Pybuthrin in an organic carrier) applied at a rate of 1 lb. per 600 lb. of grain is suitable for mixing with grain which is exposed to infection, being free from toxic hazards, risk of tainting or effect on seed germination. This grain protectant protects grain against a wide range of grain pests, including the grain weevil *Calandra granaria* and the saw-toothed grain beetle *Oryzaephilus surinamensis*, for a period of about 12 months. In a comparative trial between treated and untreated grain in a heavily infested store, grain treated with the Pybuthrin Grain Protectant had lost 1·6% of its weight (corrected for moisture content) and less than 1·3% of the grains were damaged by insects after 16 months storage, whereas untreated grain in the same store lost 6·2% of its weight and 16·5% of the grains were damaged during the same period.—W.J.B.

1227 GREAT BRITAIN. National Institute of Agricultural Botany. **Cereal quality.** *Fmrs' Leafl. 14. N.I.A.B.* [n.d.], pp. 4.

## LEGUMES

### SOYABEAN

1228 OSLER, R. D. and CARTTER, J. L. **Effect of planting date on chemical composition and growth characteristics of soybeans.** *Agron. J.* 1954, **46,** No. 6, 267-70, bibl. 4, illus. [Illinois Agric. Exp. Sta., Urbana]

In trials in Illinois during 1950-2, 7 soyabean varieties and one promising selection, L6-5679, were sown on 2 and 24 May and 12 June in 1950, and on 1, 15 and 29 May and 12 June in 1951 and 52. The early varieties Blackhawk, Hawkeye and Adams gave the highest yield when sown on 15 May. The late varieties Clark, Wabash and Perry gave the highest yields when sown on 1 May, while Lincoln, a variety of intermediate maturity, gave the highest yields when sown on either 1 or 15 May. The date of maturation of late varieties was less affected by late sowing than that of early varieties. Delays in planting tended to result in a relatively greater degree of lodging. In most cases, the greatest plant height was obtained where the earliest sowing date was used. Date of sowing had no consistent effect on seed weight. The highest average oil content of all varieties was obtained following the earliest sowing date. The seed of Adams, Clark and L6-5679 had as high or higher oil content where the plants were sown on the second date, as where the first date was used. All varieties, except Clark and Adams, had a lower seed oil content when sown at the fourth than when sown at the third date. The protein content of the seed tended to vary inversely with the oil content. A slight, but inconsistent, decrease in iodine number was associated with delays in sowing.—P.J.B.

1229 CAMERY, M. P. and WEBER, C. R. **Effects of certain components of simulated hail injury on soybeans and corn.** *Res. Bull. 400. Iowa agric. Exp. Sta.* 1953, 465-504, bibl. 6, illus.

In 2 years' trials in Iowa, soyabean plants at 5 growth stages were subjected to the following treatments in all combinations: nil, 50 and 100% defoliation and nil, 25, 50, 75 and 100% plant breakage. Defoliation reduced seed yields more than breakage, the greatest yield reduction being caused by defoliation when the seed had begun to develop in the lowest pods. Yields were least affected by defoliation before the flowering stage. At any growth stage (plant heights of 4-5 in., 14-16 in., 22-24 in., 29-31 in. and 32-34 in.), 100% defoliation reduced yields by more than twice the amount resulting from 50% defoliation. The recovery of soyabeans injured at an early growth stage was largely dependent on the weather. In favourable conditions, such injury had little effect on yields. 50 and 100% defoliation reduced seed size and quality only where done at the last two of the growth stages quoted, i.e., from late flowering to the "green bean" stage. Stem breakage, alone, had no effect on seed weight. 100% defoliation at all growth stages reduced the oil content of the seed by 1-2%. [See also Abs. 1162.]—P.J.B.

1230 WEISS, M. G. **Registration of soybean varieties, IV.** *Agron. J.* 1953, **45,** No. 11, 570-1, bibl. 4. [Pl. Industr. Bur., U.S. Dep. Agric.]

Varieties described include Perry (Reg. No. 12) and Ogden (Reg. No. 13). Perry was selected from a Patoka × L7-1355 cross. It has an upright growth habit, medium height, dense, spreading foliage, short side-branches and purple flowers. Its maturity classification is Group IV. It is adapted to a lateral belt running through eastern Kansas, central and southern Missouri, southern Illinois and Indiana and northern Kentucky. It is superior to Wabash, Chief and Patoka in resistance to lodging, seed yield and oil content. Ogden originated from a cross between a Tokyo variety and P.I.54610. It is of moderate height, has pronounced side branches and bushy, dense foliage, and moderate resistance to shattering and bacterial pustule. It is classed as Group VI in maturity and is adapted to a wide belt running through the extreme southern part of Missouri, southern Tennessee and Virginia, eastern Oklahoma, most of Arkansas, Louisiana, Mississippi, Alabama, Georgia, N. and S. Carolina and north Florida. In regional trials in 1943-50, Ogden and Arksoy gave mean yields of 26·8 and 20·9 bu. per ac., respectively.—P.J.B.

1231 ROBINSON, R. G. and DUNHAM, R. S. **Companion crops for weed control in soybeans.** *Agron. J.* 1954, **46,** No. 6, 278-81, bibl. 3, illus. [Univ. Minnesota, St. Paul]

In trials in Minnesota at 2 locations during 1952-3, winter wheat, winter rye, field peas [*Pisum sativum*], winter vetch [*Vicia* sp.], lucerne, medium red clover [*Trifolium pratense*], brome grass [*Bromus inermis*] and timothy [*Phleum pratense*] were sown at different dates as follows: (a) immediately after sowing the soyabeans and (b) 18 days after sowing the soyabeans. With method (a), the soyabeans were sown in non-cultivated rows 6 in. apart with and without companion crops and in cultivated rows 40 in. apart with and without companion crops. With method (b), the soyabeans were sown in non-cultivated rows 6 and 40 in. apart with companion crops. Weed species present included: *Chenopodium album*, *Setaria viridis*, *S. lutescens*, *Amaranthus retroflexus* and *Polygonum* spp. In non-cultivated soyabeans, wheat, rye and peas gave excellent, though not complete, weed control. Other companion crops were ineffective. Where the companion crops were sown immediately after the soyabeans, at one location, *C. album* and *A. retroflexus* were effectively controlled during both trial years, while fair control of *S. viridis* and *S. lutescens* was secured in all trials, except where the lowest sowing rate of wheat (30 lb. per ac., as opposed to 60 or 90 lb. per ac.) was used. Where no companion crops were used and the rows cultivated, better control of *S. viridis* resulted than where the best companion crop treatment was used, though where *S. viridis* was almost the only weed at one location, the use of rye resulted in 91% control of this weed, compared with 85% for cultivation, 56% for wheat and 46% for peas. At equivalent sowing rates, rye was a more effective companion crop than wheat. Where method (b) was used, all plots were infested with *Agropyron repens*. Plots sown with wheat or rye showed good control of *C. album* and *Brassica arvensis*, though the use of companion crops under these conditions was ineffective as a weed control measure. Where method (a) was used, the use of wheat or rye did not reduce soyabean yields in comparison with the cultivated or non-cultivated treatments where no companion crops were used. The use of field peas resulted in lodging of soyabeans. Sowing rates of 1 bu. of wheat or rye appeared to be suitable.—P.J.B.

1232 WILLIAMS, F. and HINKLE, D. A. **Performance of certain pre-emergence herbicides for soybeans.** *Proc. 6th South. Weed Conf. 1953* 119-21. [Arkansas Agric. Exp. Sta., Fayetteville]

In trials in Arkansas in 1952, the following pre-emergence herbicidal treatments were made to soyabeans: 4 and 8 lb. DNOSBP, 6 and 12 lb. CIPC and 2 and 4 gal. Endothal. The materials were sprayed in bands 12 in. wide and the above rates are for a total band coverage of 1 ac. At 4 weeks after sowing, 8 lb. DNOSBP and 4 gal. Endothal resulted in significant stand reductions compared with the other materials and rates used. Both 6 and 12 lb. CIPC gave excellent control of grasses. All treatments reduced stands of broad-leaved weeds. At 6 weeks after sowing, control of grasses by CIPC was still good; best control of broad-leaved weeds was secured by the DNOSBP treatments. Neither rate of DNOSBP or CIPC significantly reduced yields compared with controls, while both rates of Endothal significantly reduced yields.—P.J.B.

1233 CHAPPELL, W. E. **Weed control studies in soybeans.** *Proc. 6th South. Weed Conf. 1953* 122-5, bibl. 6. [Virginia Agric. Exp. Sta., Blacksburg]

In trials in Virginia in 1951-2, the following herbicides were applied as pre-emergence sprays to soyabeans: CIPC 3 lb. per ac., DNOSB 2·5 lb., MCPA 2 lb., Na PCP 16 lb., CMU 1 lb., 2,4-dichlorophenoxyethyl sulphate 2 lb. and ortho-chlorophenylsulphonyl fluoride 20 lb. per ac. Where no cultivation was done, the use of DNOSBP and Na PCP resulted in higher yields than those from untreated controls. Where all plots were cultivated twice, no treatment increased yields over those from controls, though weed control was significantly better than on the controls. CMU, in 1952, caused injury to the soyabeans. No treatment affected the oil or protein content of the soyabeans. Best results, in terms of weed control and lack of injury to the soyabeans, followed the use of Na PCP, DNOSBP and CIPC. In a second trial, CIPC at 3 lb. per ac. and Na PCP at 16 lb. per ac. were used as pre-emergence treatments, in all combinations with none, 1 and 2 cultivations. *Digitaria* spp. were the chief weeds. Cultivations were more important for controlling *Digitaria* spp. than were the herbicides. In a third trial on a fine, sandy loam soil, the following herbicides were applied as pre-emergence sprays in 40 gal. water, 1 day after sowing soyabeans: DNOSBP amine at 3 and 4·5 lb. per ac., CIPC at 2 and 3 lb. per ac., Na PCP at 12 and 16 lb. per ac. and *N*-1-naphthylphthalamic acid at 8 lb. per ac. Esso 38 herbicidal oil was also applied 14 days after emergence. All treatments resulted in increased yields and better weed control compared with untreated controls. There were no significant differences in yields and degree of weed control between plots cultivated and those treated with herbicides. DNOSBP and Na PCP at 16 lb. per ac. both maintained good weed control throughout the season, with no cultivations being required. Soyabeans treated with *N*-1-naphthylphthalamic acid were somewhat stunted early in the season, but yields were not significantly decreased. —P.J.B.

1234 Howell, R. W. and Cartter, J. L. **Physiological factors affecting composition of soybeans. 1. Correlation of temperatures during certain portions of the pod-filling stage with oil percentage in mature beans.** *Agron. J.* 1953, **45,** No. 11, 526-8, bibl. 10. [U.S. Reg. Soybean Lab., Urbana, Ill.]

Correlation coefficients were determined between oil content and temperatures during 10-day intervals from 50 days before maturity up to maturity in 5 soyabean varieties of Maturity Group O (adapted to S. Canada and northern USA), grown for 1 to 3 years at 8 locations, and 6 varieties of Maturity Group VIII (adapted to the Coastal Plain areas of southern and south-eastern USA), grown for 2 to 3 years at 9 locations. Separate correlation coefficients between oil content and minimum and maximum temperatures at each 10-day interval were calculated. The highest mean positive correlation coefficients for all varieties, between oil content and maximum temperatures occurred at 20 and 30 days before soyabean maturity. In the case of Group VIII varieties, the highest mean positive correlation coefficients between oil content and minimum temperatures also occurred at 20 and 30 days before maturity ; in the case of Group O varieties, this occurred at 30 and 40 days before maturity. Maximum temperatures had a greater effect than minimum temperatures on the oil content of Group O varieties ; in the case of Group VIII varieties, the opposite was true, except in the case of the last 10 days before maturity. Maximum temperatures during the last 10 days before maturity had more effect on Group VIII varieties than on those of Group 0. The average rate of daily increase in oil content in 1952 on 19 and 25 August and 1, 8 and 15 September was 0·7, 0·59, 0·58, 0·22 and −0·2%, respectively, indicating that periods more than 20 days from maturity were associated with the greatest rates of daily oil synthesis and possibly explaining why temperatures during this period had most effect on the final oil contents of soyabeans.—P.J.B.

## GROUNDNUT

1235 Sousa, O. F. de and Abramides, E. Ensaios de variedades de amendoim. Resultados de ensaios regionais. [**Variety trials with groundnuts. Results of local trials.**] *Bragantia* 1952, **12,** No. 10-12, 349-60, bibl. 4, English summary pp. 349-58. [Inst. Agron., Campinas, Brazil]

The results of regional trials with groundnut varieties carried out in the State of São Paulo during 1940-51 are reported. At Campinas, 76-Spanish-2B and 40-Roxo gave the highest yields, while at Ribeira and Pindorama, 40-Roxo and 54-Roxo yielded best. The variety commonly grown, 53-Tatu, was consistently outyielded. Over the period 1948-51 the average yields, in trials, of 76-Spanish-2B and 53-Tatu, respectively, were 2040 and 1530 kg. unshelled nuts per ha. The average yield for the State is about 1000 kg. per ha.—W.J.B.

1236 Helms, C. C. and Rodgers, E. G. **Herbicidal influences on Dixie Runner peanuts and existing weed populations.** *Proc. 6th South. Weed Conf. 1953* 143-9. [Coll. Agric., Univ. Florida]

In greenhouse trials, observations were made on the response of groundnuts to a number of herbicides applied as sprays to the soil 10 days before sowing. CMU at 4 and 10 lb. per ac., dichloral urea at 10 and 40 lb. per ac., Na TCA at 25 lb. and 2,4-D at 6 lb. per ac. were highly toxic to the plants and yields were nil. 2,4-D at 2 lb. per ac. resulted in yields 32% of those of controls ; plants receiving this treatment were delayed in maturity. Endothal at 10 and 20 lb. per ac. resulted in yields 103 and 82% of those of controls. In field trials in Florida, 2,4-D amine and ester, 2,4,5-T ester, CMU, DNOSBP, Endothal *N*-1-naphthylphthalamic acid, CIPC, and Crag Herbicide 1 (2,4-dichlorophenoxyethyl sulphate) were applied one day after sowing groundnuts. The best results in terms of groundnut yields and weed control followed the use of 2,4-D at 2 or 4 lb. per ac. or DNOSBP at 4 or 8 lb. per ac. These materials delayed the maturation of the groundnuts by up to 14 days. Endothal at 10 and 15 lb. per ac., *N*-1-naphthylphthalamic acid at 5 and 10 lb. per ac. and Crag Herbicide 1 at 2 and 4 lb. per ac. were relatively non-toxic to the groundnuts and it appeared that good weed control may result from treatments at higher rates than those quoted above, particularly in the case of the last two materials. CIPC also appeared to be worthy of further trials.—P.J.B.

1237 Evans, A. C. **Rosette disease of groundnuts.** *Nature, Lond.* 1954, **173,** No. 4417, 1242-3, bibl. 1. [Overseas Fd Corp., Nachingwea, Tanganyika Territory]

This disease is prevalent on *Arachis hypogaea* in many parts of Africa, and especially on the variety Natal Common (a short-season type usually grown in Tanganyika by the above Corporation). From a study of the insect vector (*Aphis craccivora*) as it affects Natal Common and the more disease-resistant Mwitunde variety (stands of which have a higher percentage of plants uninfested by the aphids), it is considered that the selection of a Mwitunde strain which combines high yielding capacity with good field resistance to rosette disease would be the most promising control measure.—M.H.

1238 EVANS, A. C. **Groundnut rosette disease in Tanganyika. 1. Field studies.** *Ann. appl. Biol.* 1954, **41,** No. 1, 189-206, bibl. 3, illus. [Overseas Fd Corp., Nachingwea, Tanganyika]

Rosette disease of groundnuts in Tanganyika is brought into the crop by infective alatea of *Aphis craccivora* : spread within the crop is by apterae and alatae. During the dry season the aphids maintain themselves on self-set groundnuts and on two genera of Leguminosae : *Vigna* and *Millettia* or *Lonchocarpus*. No native source of the virus causing rosette disease has been discovered, but self-set groundnuts carry over the virus from one cropping season to the next. Syrphid larvae and other predators are important in controlling the vector. Preliminary spraying trials with 0·5% Schradan gave promising results in controlling the aphids on groundnut crops and consequently checking the spread of rosette disease. Selections of the variety Mwitunde showed the lowest incidence of rosette infection and gave the highest yields in trials in 1952.—Author's summary.

1239 DEMOL, J. Essais de bouturage de l'arachide à la station de Gandajika. [**Trials in propagating groundnuts by cuttings at the Gandajika Station (Belgian Congo).**] *Bull. agric. Congo belge* 1954, **45,** No. 2, 353-66, illus.

## PEA

1240 RIEPMA Wzn, P. Onderzoekingen over cultuurmethoden bij peulvruchten. [**Research on methods of cultivating peas and beans.**] *Vijftien Jaren PSC, Peulvruchten Stud. Comb., Wageningen, 1954* 95-103.

Experiments on row-widths and seed-rates for field peas are reviewed. An experiment to test the yields of mixed crops of maize and peas sown in different ways is described. In experiments in which the field pea varieties Unica, Stijfstro, Hala and Vinco were used, there was little difference between yields of peas at distances between rows of 15, 25 and 33 cm. ; there were slight declines in yields where distances of 40 and 50 cm. were used. Optimum economic seed rates for Unica, Stijfstro and Hala were found to be 220-280 kg. per ha. on river clay soil. On sandy soil, 160-220 kg. of seed per ha. were sufficient for Unica, Stijfstro, Rondo and Servo, but Vinco needed a somewhat higher, and Hala a somewhat lower, seed rate. In general, varieties with large seed required less dense stands of plants for optimum yields than varieties having relatively small seed. Optimum seed rates and distances between rows have not yet been determined for the varieties of peas used for canning. The rate of tillering of Rondo, Zelka and Aureool, at various distances between plants and rows was also recorded in 1952-3. The average number of fertile tillers per plant in Rondo, Zelka and Aureool, in 1953, was 1·5, 1·11 and 1·19, respectively. It is thought that the varieties with a higher-than-average tillering capacity will prove more reliable than varieties which tiller less because of the superior ability of the former to make use of the greater space per plant available in unfavourable seasons when plant populations are low. Mixed sowings of maize (rows 1 m. apart) and peas for canning (either 1 or 2 rows between rows of maize) are described. Where single rows of peas were used the maize yields suffered little from the presence of the peas which gave about half their normal yield per ha.—W.J.B.

1241 GANE, A. J. **Harvesting the pea crop** [**in Gt. Britain**]. *Fmr and Stk-Breed.* 1954, **68,** No. 3374, 51-3, illus.

The stage at which peas for drying should be cut is described. Harvesting by a cutter-windrower followed by stacking the crop on wooden frames is advocated. The moisture content of threshed peas to be stored in sacks should not exceed 16% ; for bulk storage 14% should be the maximum.—C.L.S.

1242 KIFFMAN, R. Samen-und Hülsenmorphologie der zugelassenen west-deutschen Erbsenzuchtsorten und die Abartensystematik der gemeinen Kulturerbse (*Pisum sativum* L.). [**Seed and pod morphology of the registered West German bred varieties and the systematics of the common cultivated pea (*Pisum sativum*).**] *Z. Pflbau* 1954, **5,** No. 2, 49-76, illus. [Freising-Weihenstephan, W. Germany]

The registered varieties of pedigree peas which are cultivated for fodder and for human consumption as green and dried peas, exhibit a rich variety of form in seed and pod. This paper first describes, with illustrations, the general characteristics of pea seeds (shape, surface, size, 1000-seed weight, colour of seed and of hilum) and of pea pods (texture and surface, shape, size, and number of peas per pod). There follows an analysis of the distribution of these attributes among the West German registered varieties. A scheme for the botanical classification of the sub-species of *P. sativum* is given, based on the primary division into the fodder- and field-peas (*P. arvense*) with coloured flowers and the white-flowered garden peas (*P. hortense*). The West German registered varieties are then placed in their sub-species. Finally, an alphabetical list of these varieties is given.—D.B.

1243 BLANCHARD, M. Action des produits à base de dérivés organo-mercuriques sur la germination des graines d'orobanche. Méthode de lutte contre l'orobanche. [**The effect of organo-mercuric materials on the germination of the seed of broom rape. Method of controlling broom rape.**] *Proc. int. Seed Test. Ass.* 1953, **18,** No. 2, 249-52, bibl. 5. [Sta. Cent. Essais Semences Amélior. Pl. Maison-Carrée, Algiers]

A brief report is given of laboratory, pot and field trials on the use of organo-mercuric compounds for controlling *Orobanche speciosa* in pea crops in Algeria. [See *Fld Crop Abstr.* 5 : 1161.]—P.J.B.

1244 WAGER, H. G. **The effect of artificial wilting on the sugar content and respiration rate of maturing green peas.** *New Phytol.* 1954, **53,** No. 2, 354-63, bibl. 31. [Low Temp. Res. Sta., Univ. Cambridge]

Data are given of the rate of sucrose loss and $CO_2$ production by wilted green pea (*Pisum sativum*) seed held for different periods at temperatures of 15 or 25°C.—P.J.B.

1245 SPENCER, K. **Studies in soil fertility with special reference to organic manures. 1. The field experiments.** *Aust. J. agric. Res.* 1954, **5,** No. 2, 181-97, bibl. 21. [CSIRO Irrig. Res. Sta., Griffith, N.S.W., Australia]

The results are reported of experiments in 1943-6 in which the effect of rice hulls, rice straw, chaffed lucerne and pea trash, used as organic manures, on the yield of peas and horticultural crops, was tested. Seedling emergence was delayed and reduced by rice straw when only one month was allowed for decomposition but these effects were absent following 3 months decomposition. Rice straw and hulls both induced temporary symptoms of N deficiency in the absence of added N. Pea trash, chaffed lucerne and rice hulls all gave significant increases in yields. Rice straw also gave yield increases when 3 months decomposition was allowed before sowing the crop.—W.J.B.

## BEAN

1246 WAY, M. J. and others. **Studies on the bean aphid (*Aphis fabae* Scop.) and its control on field beans.** *Ann. appl. Biol.* 1954, **41,** No. 1. 117-31, bibl. 12, illus. [Rothamsted Exp. Sta., Harpenden, Herts]

Field trials on chemical control of *Aphis fabae* attacking spring-sown field beans were carried out during the years 1950-2. The sprays of various insecticides (Parathion, Isopestox, Systox and others) were applied once only, soon after primary aphid migration into the bean crop had ceased. Destruction of the few aphids present at this early date stops build-up of the big population that often develops later.—From authors' summary.

1247 MITCHELL, J. W. **Absorption and translocation of streptomycin by bean plants and its effect on the halo and common blight organisms.** *Phytopathology* 1954, **44,** No. 1, 25-30, bibl. 3, illus. [Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

Studies on the translocation of streptomycin in bean plants showed that within 5 days of the application of streptomycin to the stems, 67% of the antibiotic was translocated to the primary leaves as free streptomycin. Where streptomycin was applied to the first internode, enough was translocated to prevent halo blight (*Pseudomonas phaseolicola*) lesions developing in the primary leaves and to reduce the severity of infection in the first trifoliate leaf. Streptomycin was translocated from the proximal to the terminal portion of primary leaves, from the midrib to the margin of leaves and from the first internode upwards to the first trifoliate and primary leaves. There was no evidence of translocation in a reverse direction, or from trifoliate leaves or peduncles into the pods. Solutions of 0·1% streptomycin plus a wetting agent, applied to the surface of partially mature pods, retained some antibiotic activity for up to 2 weeks. Dipping plants showing initial symptoms of halo blight in 0·05% solutions of streptomycin reduced the severity of the disease and prevented systemic infection ; dipping plants in similar solutions 4-6 days after the onset of halo blight symptoms failed to control the disease.—P.J.B.

1248 BURTON, J. C. and others. **Response of beans (*Phaseolus vulgaris L.*) to inoculation with mixtures of effective and ineffective Rhizobia.** *Proc. Amer. Soc. Soil Sci.* 1954, **18,** No. 2, 156-9, bibl. 11, illus. [Univ. Wisconsin, Madison]

Studies are reported on the response of bean plants to effective and ineffective strains of Rhizobia applied at intervals of 21 days. Plants inoculated with both effective and non-effective Rhizobia strains at the time of sowing had N contents and dry-weight yields as high as those inoculated with effective strains, only. Ineffective Rhizobia added to bean plants 21 days after inoculation with effective strains had no adverse effect on plant growth. Plants inoculated with ineffective Rhizobia strains at sowing time were as susceptible to, and benefited as much from, inoculation as did nodulefree plants inoculated 21 days after sowing. The growth response of plants inoculated with effective and ineffective strains of Rhizobia appeared to depend to some extent on the particular strains of Rhizobia used and also upon the physiological status of the plants.—P.J.B.

1249 GARREN, R. and others. **Effect of 2,4-D on translocation and accumulation of food materials in the bean plant.** *Bot. Gaz.* 1953, **115,** No. 2, 105-21, bibl. 15, illus. [Oregon Agric. Exp. Sta., Corvallis]

The present investigation was undertaken to study in greater detail the translocation of 2,4-D, or its effects, when the chemical is applied at different locations on the bean plant. Gross morphological observations and chemical analyses are reported which show the influence of the treatments on accumulation of carbohydrates and of total dry matter in the various plant organs.—Extract.

## OTHER

1250 LECHNER, L. Ergebnisse aus dreijährigen Anbauversuchen mit Wechselwicken. [**Results from 3-year cultivation trials with winter/spring vetch [Wechselwicken].**) *Z. Pflbau* 1954, **5,** No. 2, 77-91. [Bayer. Landessaatzuchtanstalt Weihenstephan b. Freising, Upper Bavaria]

In recent years, several new varieties of winter vetch (*Vicia sativa*) have been bred and are described as "Wechselwicken", i.e. vetch types which can be cultivated as a winter or spring crop. Since all winter legumes are known to be "wechsel" types, the adjective can only be justified for those winter types which, when sown in spring, have a greater production value than spring vetch, the seed of which costs less than half that of winter vetch. These 3-year trials failed to prove the superiority of spring-sown winter vetch when compared with spring vetch.—D.B.

1251 † BATHURST, N. O. **Soluble nitrogenous constituents of lupin nodules.** *J. exp. Bot.* 1954, **5,** No. 14, 257-62, bibl. 9. [Grassld Div., Palmerston North, N.Z.]

Lupin nodules collected in two successive years were analysed for ammonia, urea, glutamine, asparagine, amino-nitrogen, peptide-nitrogen, total soluble nitrogen, and total nitrogen at fortnightly or weekly intervals from the time the plants reached full flower. The amounts of many of the constituents passed through a maximum, in the first experiment about a month after flowering, in the second at, or a few days after, flowering. On a sample taken a week after full flowering, assays were made of 17 individual amino-acids in three fractions representing free amino-acids, peptides, and soluble protein. Of the free amino-acids, those present in the greatest amount were aspartic and glutamic acids together with their amides, alanine, serine, histidine, and valine. The other two extracts showed a more even distribution of amino-nitrogen among the different amino-acids.—Author's summary.

1252 LOUSTALOT, A. J. and MUZIK, T. J. **Effect of 2,4-D on apparent photosynthesis and developmental morphology of velvet bean.** *Bot. Gaz.* 1953, **115,** No. 1, 56-66, bibl. 7, illus. [Fed. Exp. Sta., Mayaguez, Puerto Rico] [Received March, 1954]

Results of applying different concentrations of 2,4-D as a spray or dip to seedlings of *Stizolobium deeringianum* are recorded as follows. (1) 0·1% or 0·05%. Sharp reduction or cessation of photosynthesis in the leaves within 5 hours of treatment, associated with extensive damage and destruction of leaf mesophyll, and death of the plants before any pronounced modifications occurred in stem tissues. (2) 0·01%. The rate of photosynthesis declined within 5 hours of treatment and the decline continued, but several days elapsed before $CO_2$ assimilation ceased and the plants died. There was very little damage to the leaf, but extensive cell proliferation in the stem tissues, with eventual differentiation of root primordia. Sieve tubes and companion cells were crushed by the proliferation of new cells, xylem formation was inhibited and presumably also water conduction. (3) 0·001%. The rate of photosynthesis was not appreciably affected until a week or more after spraying. Terminal growth ceased, but the plants were not killed, and photosynthesis continued at a reduced rate for several weeks. The sequence of morphological developments and cell changes in the stem were similar to, but much less extensive than, those which occurred under the 0·01% treatment.—From authors' summary.

1253 PANOS, D. A. **Efficiency of balanced rotations for increasing food production and improvement of soil fertility in Greece.** *Agron. J.* 1954, **46,** No. 3, 109-12, bibl. 4. [Agric. Exp. Sta., Larissa, Greece]

The results are given of trials to compare the seed yields of a number of legume species at Larissa, Greece, following autumn and spring sowing. The results showed the superiority of improved strains. Following autumn sowing, local strains of chickpea (*Cicer arietinum*), vetch (*Vicia* sp.) and *Vicia ervilia* yielded an average of 225, 486 and 689 kg. seed per ha., while improved strains of lentil (*Lens esculenta*), vetch, lathyrus and chickpea yielded averages of 1081, 1243, 1523 and 1329 kg. per ha., respectively, during 1947-51. Rotational system trials with wheat were begun in 1937. In these trials, rotations used included continuous wheat, wheat/fallow and wheat/legumes. The results demonstrated the value of wheat/annual legume rotations for conditions at Larissa. Further trials are reported on the response of annual legumes to N and P manures. Treatments included: (a) no manure, (b) 150 kg. 20·5-0-0 (NPK) per ha., (c) 187·5 kg. 0-16-0 per ha., and 375 kg. 0-16-0 per ha. Average seed yields of 8 varieties of annual legumes, representing 7 species, during 5 years following treatments (a), (b), (c) and (d) were 1209, 1106, 1553 and 1746 kg. per ha., respectively. Respective wheat yields during a 2-year period following annual legume crops given treatments (a), (b), (c) and (d) averaged 1753, 1704, 1817 and 2005 kg. per ha. The implications of these findings for agriculture in Greece are discussed.—P.J.B.

1254 † SCARANARI, H. J. Sistema radicular das principais leguminosas empregadas como adubo verde em cafèzal. [**Root systems of the principal legumes used as green manures in coffee plantations.**] *Bragantia* 1952, **12,** No. 7-9, 291-6, bibl. 7, illus., English summary p. 296. [Inst. Agron., Campinas, Brazil]

The root systems of *Canavalia ensiformis*, *Crotalaria juncea*, *Stizolobium* sp., and *Glycine soya*, grown as green manures in coffee plantations, were studied. *Crotalaria juncea* had the most deeply penetrating root system.—W.J.B.

# ROOTS

## SUGAR-BEET

1255 JAEHNL, Gertrud. Mitteilungen über Hackfruchtversuche 1952. [**Information on root trials in 1952.**] *Ber. Arbtag., Admont 1953* 204-12.

The report covers potato trials [see Abs. 1266] and varietal trials with sugar- and fodder-beet and intermediate types, in addition to beet manurial, spacing and density trials, all conducted by the Admont Alpine Agricultural Research Station.—G.M.R.

1256 WELLENSIEK, S. J. and VERKERK, K. **Annual seed growing of beets.** *Neths J. agric. Res.* 1954, **2,** No. 2, 98-104, bibl. 9, illus. [Hort. Lab., Wageningen, Neths]

The desirability of inducing garden-, fodder- and sugar-beet to flower and produce seed within a year of planting is discussed. By the induction of annual seeding in beets, breeding programmes could be speeded up, land could be economized, the clamping of stecklings would be avoided and the seed plants would no longer be a source of contamination by virus yellows. On the other hand, with induced annual seeding, it would no longer be possible to discard natural bolters and the costs of chilling treatments and artificial illumination would have to be reckoned with. Two experiments were carried out, one in 1951 and the other in 1953, to determine the degree to which artificial illumination, low temperature and early sowing treatments would induce annual seeding in beet plants. Kuhn P sugar-beet and Groenkraag C.B. fodder-beet were used. In the first experiment identical treatments were started on 12 January and 29 January. Half the seed was sown in frames and the other half was kept in a refrigerator at 1-2°C. and high humidity for 6 weeks before being sown in frames. The plants were subjected to the following different treatments : (a) natural daylight, (b) 2 hours illumination at night plus natural daylight, (c) natural daylight plus illumination throughout the period of darkness. All plants were transplanted to the field on 9 May. The naturally-vernalized seedlings gave a higher percentage of seed-producing plants than the seed kept in a refrigerator and treatments started on 12 January gave a higher percentage than those started on 29 January. Continuous light gave a higher percentage of good seed-producing plants than the other light treatments. Even under the most favourable conditions tried, Kuhn P gave an unsatisfactory percentage of good seed-producing plants (82%) ; under the same conditions Groenkraag gave 95%. In the 1953 experiment seed kept at 1°C. for 6 weeks was sown in frames at the same time as unvernalized seed on three dates, 21, January, 2 February and 18 February. The light treatments were natural daylight and continuous illumination. In this experiment the highest percentage of seed-producing plants (98% for Kuhn P and 92% for Groenkraag C.B.) was obtained with sowing on 21 January, treatment of the seeds at 1°C. for 6 weeks before sowing and continuous illumination. In general, the treatments which raised the percentage of seed-producing plants most (early sowing, cold treatment and continuous illumination) also tended to reduce the number of seeds per plant.—W.J.B.

1257 DANILOVA, T. A. and BUNIN, V. M. [**Application of micro-elements and growth stimulators for increasing yield of sugar-beet seed.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **95,** No. 2, 399-402, bibl. 7. [All-Union Sci. Res. Inst. Beet Husbandry]

In 1953 the authors began a study of the effect of boron, molybdenum and certain growth stimulators (heteroauxin, 2,4,5,-T, and α-naphthylacetic acid) on yields of sugar-beet seed in field conditions of the Tambov Province on irrigated plots. The size of the plots was 200 m.$^2$ and there were 3 replications. During the plants' vegetative period, two waterings [amount not stated] were applied, one at the rosette stage (27 May) and one at the shooting stage (28 June). Boron and molybdenum were applied (a) to the soil (at planting time) and (b) as a leaf spray (at time of maximum flowering). 50 mg. B per plant resulted in 63·3% of plants which flowered (compared with 36·6% in the control without micro-elements) and 50 mg. Mo per plant resulted in 80% of flowering plants. The greatest seed yield, 4670 kg./ha. (compared with 2940 kg./ha. control) was obtained by applying boron (as a leaf spray) at a concentration of 0·01%. An application of Mo (also as a leaf spray) at a concentration of 0·016% resulted in 4600 kg./ha. seed yield. Of the growth stimulators, the best were 0·005% α-naphthylacetic acid (seed yield 4020 kg/ha. compared with 2940 kg./ha. control) and 0·01% heteroauxin (seed yield 4140 kg./ha.).—M.H.

1258 SCHLÖSSER, L. A. Über die Lagerungsfähigkeit von gebeiztem monogermem Zuckerrübensaatgut (System Knolle). [**The storage properties of disinfected single-germ sugar-beet seed.**] *Saatgutwirtschaft* 1954, **6,** No. 4, 88-9.

The value of a seed disinfectant for beet, especially sugar-beet, should be measured not only by its fungicidal properties but also by its power to adhere to the seed. Single-germ seed, when treated with a disinfectant and stored for a period, suffers injury to the embryo and gives lower germination, therefore the production of single-germ seed should be limited to the season's requirements.—D.B.

1259 AEBI, H. and RAPIN, J. Lutte contre la cercosporiose de la betterave sucrière. [**Control of leaf spot in sugar-beet.**] *Rev. rom. Agric.* 1954, **10,** No. 6, 45-7, bibl. 11, illus. [Sta. Féd. Essais Agric., Lausanne, Switzerland]

The measures recommended for control of *Cercospora beticola* on sugar-beet foliage are : the prevention of its spread by good agricultural methods, which include a 3-year rotation and feeding of the beet tops in the form of silage rather than as fresh herbage ; the treatment of foliage with fungicides; and the breeding of resistant varieties.—D.B.

1260 GIARDINI, A. and MONTUSCHI, G. Nuovi contributi sperimentali per la lotta contro la cercospora della barbabietola da zucchero. [**New trials in controlling *Cercospora beticola* on sugar-beet.**] *Industr. saccar. ital.* 1954, **47,** No. 3-4, 93-100, bibl. 2, illus.

Results from trials in 1953 confirmed that copper compounds (sulphate, oxychloride, etc.) were more effective than other preparations tested in controlling *Cercospora beticola* leaf spot. [See also Abs. 170.]—E.B.O.

1261 ROUBAIX, J. de and LAZAR, O. Métabolisme respiratoire de la betterave sucrière de la graine à la graine. [**Respiratory metabolism of the sugar-beet throughout its life.**] *Publ. techn. Inst. belge Amélior. Better.* 1954, **22,** No. 1, 3-16, bibl. 10, illus. [Raffinerie Tirlemontoise]

The respiration measurements were made at a temperature of 23°C. on whole plants and on cut roots, the material having been obtained from plants grown in the field and in water culture. The results revealed 5 respiration stages, and these correspond with the 5 morphological stages of growth. They are : (1) the stage of primary differentiation (0-7 days) when respiration rate increases ; (2) secondary differentiation (8-25 days) with a constant respiration rate ; (3) decortication stage (26-60 days) with intense respiration ; (4) tuberization (61-120 days) when respiration rate decreases ; and (5) maturity (121 days and over) when respiration rate is retarded. During the first 3 stages the respiration rate is 4-7 times as great as in the 2 further stages. The results of these experiments show that cultivation methods should be based on fundamental studies of the physiological requirements of the plant. In particular, the high respiration rate in the early stages of the plant's life demonstrates the need for a well-aerated seed-bed.—D.B.

1262 BECAGLI, G. Attività transaminasica nelle foglie e nella radice di *Beta vulgaris* var. *saccharifera*. Nota 1. [**Transaminase activity in the leaves and root of sugar-beet (*Beta vulgaris* var. *saccharifera*). Note 1.**] *Ann. Sper. agr.* 1954, **8,** No. 3, 893-8, bibl. 7, English summary p. 898. [Sta. Chim.-Agr. Sper., Roma]

[See also *Fld Crop Abstr.* 7 : 673.]

1263 THORNE, G. N. and WATSON, D. J. **Plant nutrition. Nutrient uptake from leaf sprays.** *Rep. Rothamst. Exp. Sta. 1953* Harpenden, 1954, 69-70.

Experiments were carried out on the recovery of nutrients by sugar-beet and swedes treated with foliar sprays, on the effect of foliar sprays on the grain yields of wheat and on the effect of foliar sprays with urea on the N-content of sugar-beet leaves. In the first experiment, an attempt was made to determine whether the low recovery of nutrients applied to the leaves of sugar-beet in the experiment described in Abs. 149 could be accounted for by a reduction in the nutrient uptake by plant roots as a result of foliar spraying. Sugar-beet plants growing in soil were sprayed either with water or ammonium nitrate solution labelled with the radioactive isotope $N^{15}$, and swedes growing in a $P^{32}$-labelled nutrient solution were sprayed either with water or normal sodium phosphate. In neither case was the nutrient uptake by the roots of the plants sprayed with nutrients significantly less than that of the controls sprayed with water and, as before, only about half of the estimated N or P supply from the spray was recovered in the plants. In the second experiment, ammonium nitrate applied to winter wheat as a foliar spray in May and June produced about the same increase in grain yield as an equal quantity of ammonium nitrate applied to the soil at the same time or as an equivalent top-dressing of nitro-chalk in April. The recovery of N was similar for all 3 methods of application. In the third experiment, urea containing 32 and 64 lb. of N per ac., was applied to sugar-beet leaves as single applications of low-volume spray and in 4 applications of high-volume dilute spray. The single applications caused some scorching, especially at the higher rate of application, but increased the N content of all parts of the plant to about the same extent as the 4 applications of dilute spray. Spraying at the higher rate increased the N-content of the leaf lamina by 45%, while equivalent applications of urea to the soil produced no detectable increase. The yield of sugar was slightly reduced by the foliar sprays.—W.J.B.

## FODDER-BEET

1264 WATERSON, H. A. **Fodder-beet in the West of Scotland.** *Bull. 149. West Scot. agric. Coll.* 1953, pp. 15, bibl. 9.

Brief notes on the characteristics and cultivation of fodder-beet are given. Data are given of the results of 3 years' trials at Auchincruive with the fodder-beet varieties Gul Daeno X, Rød Øtofte X, Pajbjerg Rex X, Hunsballe X, Webb's fodder sugar-beet and the mangel variety Eldorado. Root yields and dry-matter contents varied from year to year, but all varieties maintained their relative positions to one another. In one year only (1950) were there significant differences between the dry-matter yields of different varieties, when Gul Daeno and Webb's fodder sugar-beet gave significantly higher yields than Eldorado. It was concluded that in the West of Scotland, fodder-beet varieties are unlikely to produce more dry matter per ac. than mangel varieties, though, in most cases, yields of tops are considerably higher in the case of fodder-beet. Crude-protein contents in the roots decreased as dry-matter contents increased. In trials in 1952, the total fresh-weight yield of tops + roots of fodder-beet varieties were significantly higher than those of Eldorado, though differences in total dry-matter and crude-protein yields per ac. were not significant. On the basis of these results, no variety of fodder-beet could be singled out as particularly outstanding.—P.J.B.

## POTATO

1265 ARGENTINA. Ministry of Agriculture. Cultivo de la papa en la Provincia de Buenos Aires. [**Potato-growing in the Province of Buenos Aires.**] *Tech. Comm. 9. Argent. Minist. Agric., Div. Hort.* 1954, pp. 28, illus.

The climatic conditions suitable for potato-growing in Argentina are discussed and the geographical situation of the potato-growing regions of Buenos Aires Province is defined. Suitable varieties are described and rules for the planting, cultivation, harvesting and conservation of potatoes in the Province are laid down. The pests and diseases of potatoes, and, where possible, their control are indicated.—W.J.B.

1266 JAEHNL, Gertrud. Ergebnisse der Kartoffelversuche 1953. [**Results of the 1953 potato trials.**] *VersErgebn. Bundesanst. alp. Landw., Admont* 1954 No. 24, pp. 50, bibl. in text, illus.

INVESTIGATIONS REPORTED:

1. Varietal trials, pp. 1-19. Eleven early and 17 late potato varieties were tested for suitability under alpine conditions and were classified according to the yield obtained, the classification in the especially moist summer of 1953 being very different from that of 1952. Virus attack was not severe, virus X being that most commonly observed. Leaf disease caused by *Phytophthora* was heavy, especially in the late varieties, and repeated spraying did not control it. Tuber disease was relatively severe in both early and late varieties.
2. Planting, size of seed potatoes and cutting trials, pp. 19-41. The effects of using seed potatoes of normal size and of abnormally large size were compared, and not only were whole tubers planted, but some were halved longitudinally and others transversely, so that the planting of crown halves and bottom halves could be compared. Tabulated results show that in 95% of all the cases the highest yield was obtained from planting whole tubers, and in 89% of all the cases the lowest yield came from planting the bottom halves of the cut tubers. On the other hand, in the early and medium-early varieties, the cut crown halves of large tubers gave a yield on an average 11% higher than that obtained from planting whole tubers of normal size.
3. Manurial trials, pp. 42-9. These were conducted in 5 places to determine the best time for applying fertilizers. No increase in yield was obtained from late applications when normally stored seed potatoes were used, but in one place where pre-sprouted tubers with long shoots were planted, the highest yield was obtained from applying all the fertilizers (NPK) 3 weeks after planting.—G.M.R.

1267 Nielsen, L. W. **The susceptibility of seven potato varieties to bruising and bacterial soft rot.** *Phytopathology* 1954, **44,** No. 1, 30-5, bibl. 12, illus. [N. Carolina State Coll., Raleigh]

The varieties Irish Cobbler, Bliss Triumph, White Cloud, Sebago, Essex, Kennebec and Chenango were grown in N. Carolina under similar conditions and harvested at intervals during 12 June to 4 July. All tubers were immature on 12 June, though the early varieties reached maximum yields on 19 June. Determinations of the susceptibility of the tubers to bruising, showed that the early varieties Bliss Triumph and Irish Cobbler were most susceptible, followed by White Cloud in an intermediate position, with the late varieties all equal in possessing relative resistance to bruising. In determinations of resistance to bacterial soft rot, caused by *Erwinia carotovora*, Irish Cobbler was most susceptible in terms of total infection, followed by White Cloud and Chenango ; Kennebec and Sebago were only slightly less susceptible than these 3 varieties, while Essex and Bliss Triumph were consistently the most resistant. Incubation temperatures of 61°F., as compared with 85°F., were effective in reducing the amount of tuber infection and its rate of spread. Washing the tubers increased the number of wounds which became infected. Studies on the relative susceptibility of tubers to bacterial soft rot, as influenced by solar heating of the tubers to temperatures up to 111·2°F. showed that the threshold of heat injury was about 109°F.—P.J.B.

1268 Kapoor, S. L. **The role of type of seed in the culture of potato. Relative vigour of apical, vertical and basal sets.** *Proc. Indian Acad. Sci. Sect. B* 1951, **33,** No. 5, 277-81, bibl. 16. [Coll. Agric., Benares Hindu Univ.]

Seed tubers, of the variety Darjeeling red round, were cut into apical, basal and vertical pieces each weighing 20 ± 1 g. The cut setts were planted in pots of manured field soil, in a replicated experiment, and the germination, date of emergence of sprouts and yield of tubers were recorded for each sett. The number of days after planting required for the full emergence of sprouts from apical, vertical and basal setts was 12, 16 and 16, respectively. Plants from apical setts grew more rapidly than those from basal setts at first, but at 90 days after planting the differences were beginning to disappear. The yield of tubers from apical setts was slightly greater than from vertical setts and almost significantly greater than from basal setts. The tubers from basal setts were fewer in number and had a greater average size than those from apical and vertical setts.—W.J.B.

1269 Bonde, R. **Antibiotic stops potato rot ; potential farm use.** *Maine Fm Res.* 1954, **2,** No. 1, 9-10, illus.

Freshly-cut seed potato setts were sprayed with organisms causing blackleg and seed-piece decay, before being soaked in solutions of streptomycin sulphate and terramycin hydrochloride. In greenhouse trials, treating the setts for 10-30 min. in 25 ppm. concentrations of streptomycin sulphate, or streptomycin sulphate + terramycin hydrochloride, almost completely prevented seed-piece decay, while 80-100% of untreated setts decayed. Terramycin hydrochloride, alone, did not prevent blackleg attack. In field trials, similar 30 min. treatments of blackleg-infested cut setts with 50 ppm. concentrations of antibiotics resulted in full plant stands, while almost all untreated setts were destroyed.—P.J.B.

1270 Simonds, A. O. and others. **Comparative effects of catechol, some related compounds, and other chemicals on suberization of cut potato tubers.** *Bot. Gaz.* 1953, **115,** No. 2, 190-5, bibl. 6, illus. [Colorado Agric. Exp. Sta.]

Treatment with ortho-dihydric phenols stimulated the formation of a thicker suberized layer on the wound tissue of cut potato tubers than that formed on the untreated tubers (i.e. by the process of natural healing). Of these [ortho] compounds, catechol was the most effective for stimulating wound healing. It is also cheap. Resorcinol, a meta-dihydric phenol, retarded the process, apparently interfering with the action of tyrosinase.—D.B.

1271 Terrier, Ch. Principes de lutte contre le mildiou de la pomme de terre. [**The principles governing the control of mildew** (*Phytophthora infestans*) **in potato.**] *Rev. rom. Agric.* 1954, **10,** No. 5, 37-9, illus. [Sta. Féd. Essais Agric., Lausanne, Switzerland]

1272 Zeller, W. Zur Beurteilung und Bekämpfung des Phytophthorabefalles der Kartoffeln. [**On estimating an attack of Phytophthora in potato, and its control.**] *Schweiz. landw. Mh.* 1954, **32,** No. 5, 211-14.

In this paper, a practising farmer records some aspects of his experience in combating potato blight [*Phytophthora infestans*]. He gives a scale for judging the severity of the attack and discusses the amount of fungicide to be sprayed and the spraying technique.—D.B.

1273 England and Wales. Ministry of Agriculture and Fisheries. **Potato root eelworm** [***Heterodera rostochiensis***]. *Adv. Leafl. 284. England and Wales. Minist. Agric. Fish.* 1953, pp. 6.

1274 Scottish Agriculture. **Notes from Auchincruive—7.** *Scot. Agric.* 1954, **33,** No. 4, 218-19.

In trials to control potato root eelworm, DD (dichloropropene-dichloropropane), EDB (ethylene dibromide) and mercuric compounds were used. Trials with DD showed that it would reduce the number of eelworm larvae and eggs in cysts and directly stimulate potato yields, even where no eelworms were present. Observations are made on the economic aspects of using DD and on the use of 7-year rotations, involving 2 applications of DD.—P.J.B.

1275 GOULD, G. E. and MCCROSKY, L. L. **Potato flea beetle control with new insecticides.** *J. econ. Ent.* 1954, **47,** No. 1, 190.

Dieldrin and Heptachlor, at a rate of 0·75 lb. per acre per application gave excellent control of the flea beetle (*Epitrix cucumeris*).—From authors' summary.

1276 BOOCK, O. J. Diplópoda depredador de tuberculos de batatinha. [**Attacks on potato tubers by a species of millipede.**] *Bragantia* 1952, **12,** No. 10-12, 343-7, bibl. 8, illus., English summary pp. 346-7. [Limeira Exp. Sta., Inst. Agron., Campinas, Brazil]

Serious damage to potato tubers by millipedes identified as *Pseudonannolene paulista* was noted in two experiments with potatoes in 1952. In the first experiment, 2 varieties imported from Sweden, Konsuragis and Eigenheimer, were grown with basal dressings of P and K and 80 kg. N per ha. applied as ammonium sulphate, cotton meal or castor meal. Both varieties were damaged by the millipede, but more damage was done to Konsurgis than to Eigenheimer. With applications of ammonium sulphate, castor meal and cotton meal, respectively, 10, 20 and 24% of Konsuragis tubers were damaged. In the second experiment, in which varieties from the Netherlands were tested, the percentages of the varieties Bintje, Eersteling, Saskia, Gineke, Eigenheimer, Voran and Alpha damaged by millipedes were 30, 20, 18, 14, 12, 12 and 6%, respectively. The relatively high resistance of Alpha is attributed to the tough skin characteristic of the variety. The attack took place during a period of hot weather and low rainfall.—W.J.B.

1277 BOOCK, O. J. O combate ao *Pseudococcus maritimus* da batatinha, pelo brometo de metilo. [**Control of mealybug *Pseudococcus maritimus* by methyl bromide.**] *Bragantia* 1952, **12,** No. 10-12, 361, English summary pp. 361-2. [Inst. Agron., Campinas, Brazil]

Experiments to control mealy-bug infestations of potato tubers are briefly described. Dust applications of 0·5% Rhodiatox at the rate of 300 g. per 70 kg. of tubers gave good control and prevented re-infestation ; but because of the toxic nature of Rhodiatox, tubers treated in this way cannot be used for human consumption. Methyl bromide at the rate of 150 cc. per 28·6 cu. m. in a vacuum chamber controlled the pest without inhibiting sprouting. Potatoes treated with methyl bromide can be used for food.—W.J.B.

1278 RÖNNEBECK, W. Erfolgsaussichten der chemischen Bekämpfung von Virusüberträgern im Kartoffelfeld. [**A review of the results obtained by the chemical control of virus vectors in potato fields.**] *Z. Pflkrankh.* 1954, **61,** No. 4, 184-96, bibl. 20. [Lab. Prof. Dr. H. Blunck, Bonn am Rh., Germany]

1279 STEINECK, O. Bormangelschäden bei Kartoffeln. [**Boron-deficiency damage in potatoes.**] *Z. PflErnähr. Düng.* 1954, **64** (**109**), No. 2, 154-67, bibl. 19, illus. [Hochsch. Bodenkultur, Vienna]

Boron-deficiency symptoms were studied in the potato varieties Ackersegen and Sieglinde grown in soil which was found to be deficient in boron. The application of 20 kg. borax per hectare produced a completely normal yield in Ackersegen.—G.M.R.

1280 KOPETZ, L. M. and STEINECK, O. Photoperiodische Untersuchungen an Kartoffelsämlingen. [**Photoperiod tests on seedling potato plants.**] *Züchter* 1954, **24,** No. 2/3, 69-77, bibl. 17, illus. [Inst. Pflanzenbau und Pflanzenzüchtung, Hochschule für Bodenkultur, Wien, Austria]

Field experiments were conducted on 2-year-old potato plants, raised from seed and of known parentage, to test the effect of reducing day-length to 10 hours. In order that environmental conditions should be as normal as possible, the plants remained uncovered during the natural hours of darkness and covered only for a period sufficient to bring the dark period to a total of 14 hours. Artificial darkness was effected by covering plants with sheet aluminium boxes, 2 m. × 1 m. and 0·6 cm. high, the short side walls having shaded air slits. Compared with plants under normal day-length, short-day plants gave an increase in the yield of tubers while the shape of the tubers was improved.—D.B.

1281 THIJN, G. A. **Observations on flower induction with potatoes.** *Euphytica* 1954, **6,** No. 1, 28-34, illus. [Potato Breed. Sta., Emmeloord, N.E. Polder, Netherlands]

Studies are reported on methods of inducing flowering in the variety Bintje, which normally seldom produces berries. Successful methods of inducing flowering, including grafting on tomatoes, double grafting, planting on bricks and incision and ligature of stems, are described.—P.J.B.

1282 NISSEN, M. Kartoflers vaegt i vand. Undersøgelser over forholdet mellem kartoflers tørstof og stivelseindhold og deres vaegt i vand, dels med og dels uden luftuddrivning. [**The weight of potatoes in water. Investigations of the relationship between the dry-matter and starch content of potatoes and their weight in water, with and without the evacuation of air from the potatoes.**] *Tidsskr. Planteavl* 1954, **51,** No. 1, 121-64, bibl. 7, English summary pp. 162-3.

Studies, carried out at Tylstrup during 1937-51, are reported on methods of determining the dry-matter content of potatoes on the basis of determinations of their weight in water. Methods of determining the dry-matter content are critically reviewed, with particular reference to Maercker's method, which is in general use in Denmark. It is shown that the dry-matter content of potatoes is not a direct function of their specific gravity, but of their weight in water, where the specific gravity of their dry matter is constant. Observations are made on determinations using rasped potatoes weighed in containers in a vacuum. In determinations of starch content by Ewer's polarization method, the difference between the dry-matter content and starch content averaged 5·31 percentage units, the difference increasing slightly as dry-matter contents increased. The average specific gravity of the dry matter, as determined by pycnometer, was 1·669. No correlation between dry-matter content and the specific gravity of the dry matter was found. In trials in which whole tubers were immersed in water in a vacuum for 30 min. and allowed to stay for 10 min. under water after the air was re-admitted, it was possible to remove all air from the tubers. A formula is given for calculating the dry-matter content of tubers treated in this way, which gives results differing only slightly from those obtained by drying the tubers in an oven.—P.J.B.

1283 CROWTHER, E. M. **Alternative phosphate fertilizers.** *Rep. Rothamst. exp. Sta. 1953* Harpenden, 1954, 40-2.

Potatoes grown on soils with pH values of 5·5 or less, 5·6-6·5 and over 6·5, and swedes grown on soils with pH values of 5·5-6·0 were given the following treatments : (a) no phosphate, (b) superphosphate (at the rate of 0·33 cwt. $P_2O_5$ per ac.), (c) superphosphate (0·66 cwt. $P_2O_5$ per ac.), (d) dicalcium phosphate (0·5 cwt. $P_2O_5$ per ac.), (e) silicophosphate (0·5 cwt. $P_2O_5$ per ac.) and (f) Gafsa ground mineral phosphate (0·5 cwt. $P_2O_5$ per ac.). At all pH levels and for both crops, dicalcium phosphate gave yields only slightly less than equivalent superphosphate. Treatment (e) (silicophosphate) gave yields of potatoes of 11·2 cwt. per ac. at the lowest pH level and 9·6 at the highest pH level whereas treatment (c) gave 11·6 and 10·3 cwt. per ac. at the two levels, respectively. Thus silicophosphate was only slightly less effective than superphosphate and dicalcium phosphate on acid soils but was markedly less effective than superphosphate on neutral soils. Treatment (f) gave potato yields of 10·3 and 9·2 tons per ac. at the lowest and highest pH levels, respectively ; it was as effective as silicophosphate on swedes. A preliminary experiment on the use of different types of nitrophosphate applied to potatoes and grass is also reported.—W.J.B.

1284 HAWKINS, A. **Time, method of application and placement of fertilizer for efficient production of potatoes in New England.** *Amer. Potato J.* 1954, **31,** No. 4, 106-13, bibl. 24. [Univ. Connecticut, Storrs]

This is a review of experimental results obtained mainly in New England.—E.B.O.

1285 MCALLISTER, J. S. V. **Potash requirements of the potato crop in Northern Ireland.** *N. Ire. Minist. Agric. Res. exp. Rec.* 1952, 12-20, illus., bibl. 5, Belfast ; HMSO, 3s. 6d.

The results are given from five field experiments on the potato crop in which the effects of varying levels of potash manuring have been studied. The results show that when no dung is applied a good response was always obtained from the application of 1 cwt. muriate of potash per acre. Responses to larger applications depend upon the potash status of the soil. At the 3 centres where treatments including farmyard manure were compared, a dressing of approx. 15 tons farmyard manure per acre supplied sufficient potash for the crop and no yield response was obtained from additional dressings of potash. Yields and results of leaf and tuber analyses indicated that in the year of application the dressing of farmyard manure supplied potash equivalent to 2-3 cwt. muriate of potash. The results of soil analysis were found to give a good indication of the potash status and of the need for potash to ensure good potato crops. The existence of potash deficiency in a potato crop may be diagnosed or confirmed by leaf analysis, provided allowance is made for the stage of growth of the crop, and also by the analysis of tubers from the crop.—Author's summary.

1286 EAVES, C. A. and LEEFE, J. S. **Nutrient levels and yields of Netted Gem potatoes as influenced by nutritional treatment on various soil types.** *Proc. Amer. Soc. hort. Sci.* 1953, **62,** 377-83, bibl. 16. [Exp. Sta., Kentville, Nova Scotia, Canada]

In trials in Nova Scotia, Netted Gem potatoes were grown at 3 locations on sand, loam and clay soils, respectively, and received 500, 1000, 2000, or 4000 lb. 20% $P_2O_5$ superphosphate per ac., combined with either 166 or 500 lb. of 60% $K_2O$ muriate of potash per ac. All plots received 500 lb. ammonium sulphate per ac. Data are given on the effect of these treatments on yields and on levels of N, P, K, Ca, Mg and Cl in the leaf petioles. Increasing P treatments were reflected in linear increases in P concentrations in the petioles, particularly on sandy soils. K treatments did not appear to affect the P content of the petioles. Increases in the rate of K applied increased the K content of the petioles, particularly on the sandy soil. There was an interaction between P and K. There was a marked decrease in the K content of the petioles where 166 lb. muriate of potash was combined with 4000 lb. superphosphate per ac. The content of Mg in the petioles varied considerably, but was lowest where the higher rate of K was applied. Ca contents in the petioles increased as superphosphate treatments increased, but were decreased by the higher rate of K treatment. There was evidence that high rates of both K and P treatment increased the Cl content of the petioles, but the effect was significant on the sandy soil, only. Highest tuber yields were obtained on the loam soil. K treatments increased tuber yields, while P treatments did not.—P.J.B.

1287 VEZIN, C. Vingt années de controle officiel des plants de pommes de terre. [**Twenty years of official control of the potato plant.**] *C.R. Acad. Agric. Fr.* 1954, **40,** No. 8, 348-53.

This résumé of progress in potato cultivation is divided into 4 periods: 1922-33, selection of varieties; 1934-40, the inauguration and carrying out of official control; 1941-8, increased production; and 1949-54, technical progress particularly as regards disease control.—D.B.

1288 LONGCHAMP, R. and GAUTHERET, R. J. Recherches sur la conservation des pommes de terre par l'hydrazide maléique. [**Research into the conserving of potatoes with maleic hydrazide.**] *Ann. Inst. nat. Rech. Agron., Paris. Ser. A. Ann. Agron.* 1954, **5,** No. 2, 207-24, bibl. 19, illus. [Sta. Physiol. Vég., Versailles (R.L.); and Fac. Sci., Univ. Paris (R.J.G.)]

The effect of the application of germination inhibitors to the leaves of potato plants for the purpose of improving the storage qualities of the potato crop has been investigated. Salts of maleic hydrazide were applied by spray at the end of the growing season (July) at the rates of 10, 3, 1 and 0·3 kg./ha. An account is given of the changes which took place in the appearance and carbohydrate content of the potatoes from treated plants, and in the anatomy of tubers, rhizomes and scale leaves. There was no change in the flavour of the potatoes from treated plants, even with the strongest application of maleic hydrazide. While the usefulness of maleic hydrazide for potato storage has been established, no general recommendations can yet be made concerning the particular salt to use or the rate of application.—D.B.

1289 CLAVER, F. K. Inhibición de la brotación de tubérculos de papa por pulverizaciones de las plantas con hidrazida maleica. [**Inhibition of sprouting in potatoes by spraying the plants before harvest with maleic hydrazide.**] *Rev. Fac. Agron. Eva Perón* 1953, **29,** 2a, 207-12, bibl. 7, illus., English summary p. 211. [Fac. Agron. Eva Perón, Argentina]

The foliage of Katahdin potatoes was sprayed, 47 days before harvest, with maleic hydrazide at a concentration of 1500 ppm. Rows of potatoes used as controls were sprayed with water only. All potatoes were harvested and stored for 8·5 months at an average temperature of 14·2°C. The sprouting of the treated potatoes was inhibited. The weight of sprouts yielded per 10 treated potatoes was 2·7 g. after 6·5 months and 25 g. after 8·5 months of storage. Untreated potatoes yielded 28 and 60 g. of sprouts per 10 potatoes after 6·5 and 8·5 months of storage, respectively. The apical dominance of the treated tubers was broken and treated potatoes were less dehydrated than untreated ones. It was not found possible to reactivate the growth of sprouts on treated tubers by means of an application of indoleacetic acid at a concentration of 200 ppm.—W.J.B.

1290 TIZIO, R. and MONTALDI, E. R. Influencia de las temperaturas de almacenaje sobre la capacidad productiva de la variedad de papa "Huinkul." [**Influence of storage temperature on the productive capacity of Huinkul seed potatoes.**] *Rev. Fac. Agron. Eva Perón* 1953, **29,** 2a, 133-48, bibl. 8. [Fac. Agron. Eva Perón, Argentina]

The influence of storage temperature on the field performance of Huinkul seed potatoes was tested in an experiment in 1952. Two-hundred-and-fifty-one potatoes were halved and each pair of halves numbered identically for purposes of comparison. One set of halves was stored for 55 days at an average temperature of 28·2°C.; the other set was stored during the same period at an average temperature of 7·1°C. After completion of the storage treatment the two sets of halves were planted on 25 September. The group of halved seed potatoes stored at a high temperature yielded, on an average, 15·6% more tubers than the group stored at a low temperature; the total yield by weight of the first group was 11·2% greater than that of the second. Nevertheless, in the case of about 30% of the pairs of tubers compared, the yield of the halved tuber stored at a low temperature was greater than that of the corresponding half stored at a high temperature.—W.J.B.

1291 Belgium. Station de Recherches de l'Etat pour l'Amélioration de la Culture de la Pomme de Terre, Libramont. [**Potato Research Station, Libramont.**] 1952. *Rev. Agric., Brux.* 1953, **6,** No. 12, 1739-49, bibl. 13. [Received Jan., 1954]

Investigations reported :

1. Breeding, pp. 1739-45. A progress report is presented on breeding for resistance to leaf-roll virus, to virus X, virus Y and virus A, to *Phytophthora*, gall, nematodes and *Leptinotarsa decemlineata* Gay.
2. Varietal trial of fodder potatoes, pp. 1745-6.
3. Optimal conditions for obtaining healthy seed potatoes, pp. 1746-8. The tuber test having given excellent results, it is hoped to extend its use for the supervision and classification of seed material. New varieties are being multiplied for distribution, the most interesting being Crésus, Diane, Espoir, and Euterpe. The foreign varieties Aquila and Capella are also being multiplied.—G.M.R.

## SWEET POTATO

1292 Bulletin d'Information de L'INÉAC. Les activités agronomiques de la Station de Keyberg. [**The agronomical work at the Keyberg Station (Katanga, Belgian Congo).**] *Bull. Inform. I.N.E.A.C.* 1954, **3,** No. 2, 81-109, illus.

In a variety trial with fodder sweet-potato, C.S.K. No. 3 yielded 33·5 tons of green matter and 10·2 tons of tubers per ha., and Kaponda 24·5 and 9·8 tons, respectively. In potato varietal trials, the local, late variety Bulongwe yielded better than 60 introduced varieties.—E.B.O.

1293 Camargo, A. P. de. Novos tipos de batata doce oriundos de mutãção somatica. **New types of sweet potatoes arising from somatic mutation.** *Bragantia* 1952, **12,** No. 10-12, 315-19, bibl. 12, illus. [Inst. Agron., Campinas]

Somatic mutations affecting the root colour of sweet potatoes were recorded. In general, as a result of mutations, the periderm and cortex of the roots changed from reddish to cream in colour. The plants resulting from mutations of the varieties 98-Castelo and 18-Dahomey give yields equal to those from the normal forms of the varieties.—W.J.B.

1294 Ezell, B. D. and Wilcox, Marguerite S. **Sweet potatoes. Physiological and biochemical effects of maleic hydrazide on pre- and post-harvest behaviour.** *J. agric. fd Chem.* 1954, **2,** No. 10, 513-15, bibl. 9. [Biol. Sci. Branch, Agric. Mktg Serv., U.S. Dep. Agric., Beltsville, Md]

In trials in Maryland, Orange Little Stem sweet potatoes were sprayed with 3300 ppm. concentrations of maleic hydrazide at a rate of 8 lb. active material per ac., 27 days before harvest. At 23 days before harvest Yellow Jersey sweet potatoes were sprayed with 6600 ppm. concentrations of maleic hydrazide at a rate of 16 lb. active material per ac. Tubers from untreated plants were harvested at the time of the spray application to the treated plants and also at the time the treated plants were harvested. Both varieties received the same cultivation treatments prior to spray application and were grown on Chillum sandy loam. After harvest, the tubers were cured for 8 days at 85°F., before storage for 5 months at 60°F. Sprayed vines did not appear to be markedly affected by maleic hydrazide treatments. Orange Little Stem tubers, harvested after treatment, were normal at harvest, but after a short exposure to the atmosphere, a gelatinous exudate was noted on some tubers, accompanied by numerous pock marks. In the case of Yellow Jersey tubers, similar pock-marking, but no exudate, was noted. Both varieties were affected to a similar extent. Maleic hydrazide had no noticeable effect on carotene accumulation in the tubers during the period from treatment to harvest. However, after harvest, the accumulation of carotene and carotenoid and other pigments was prevented in Orange Little Stem and significantly reduced in Yellow Jersey tubers by the treatments. Sound Orange Little Stem tubers, following treatment, suffered considerably more decay and loss of weight than untreated controls, or treated Yellow Jersey tubers.—P.J.B.

## CASSAVA AND YAM

1295 Pacheco, J. A. de C. Nota. Alterações de qualidade da fécula durante o armazenamento das raízes de mandioca. [**Notes on changes in starch quality during the storage of cassava.**] *Bragantia* 1952, **12,** No. 7-9, 297-8, English summary p. 298.

Determinations of the colour, viscosity and speed of sedimentation in samples of starch from fresh cassava (*Manihot utilissima*) roots and roots stored for 24, 48 and 72 hours indicated a progressive deterioration in the quality of the starch extracted from roots stored for longer than 24 hours.—W.J.B.

1296 Sasuke, N. **Bread-fruit, yams and taros of Ponape Island.** *Proc. 7th Pacific Sci. Congr. Pacific Sci. Ass., 1949, Vol. 6, Soil Resources, Forestry and Agric.* 1953, 159-70, bibl. 4, illus. [Christchurch, New Zealand] [Received May, 1954]

Details are given of the species and varieties of yam grown on the island (*Dioscorea alata*, *D. esculenta*, *D. flabellifolia* and the wild *D. bulbifera*). Some undetermined species are also found on the island. The inhabitants of Ponape distinguish 24 cultivated types of *D. alata*, which are described; they also distinguish 6 cultivated types of *Cyrtosperma chamissonis*.—W.J.B.

## FIBRE CROPS

### COTTON

1297 † USSR. Academy of Sciences. Committee for the Study of Productive Power. [**Cultural measures and mechanization in cotton-raising under a grass/arable farming system.**] [Russian] *Trans. Aral/Caspian Expdn Pt 2.* By A. A. Ivančenko. 1953, pp. 221, bibl. 200, illus., Moscow; Acad. Sci. USSR, 26 × 17 cm., 16 roubles, 65 kopeks [= approx. 33s.]

For Part 1 of these Transactions see Abs. 1437. It is claimed that an essential measure for the success of cotton raising under irrigation in Soviet Central Asia and Southern Kazahstan is the use of a cotton/herbage system in which the courses are shortened to a 5-, 6- or 7-year cycle. Cotton should not be included for more than 4 or 5 years in succession before using a 2 year grass/legume crop for ploughing in. It may be profitable to extend the herbage course to 3 years where soil conditions are unsatisfactory. Information is supplied on the necessary cultural measures, shelter-belt construction, use of fertilizers, irrigation, mechanization and economics.—M.H.

1298 † Mišustin, E. and Naumova, A. [**The toxic effect of lucerne on cotton crops under prolonged use of this leguminous component in cotton/lucerne rotations.**] [Russian] *Hlopkovodstvo* (*Cott. Gr.*] 1954, **4**, No. 6, 51-6. [Microbiol. Inst., Acad. Sci., USSR]

While the beneficial effects on the soil of lucerne in cotton rotations have been recognized, it has also been observed that cotton seedlings frequently perish when sown on a ploughed lucerne stand, especially that of the 3rd or 4th year. Various field and laboratory tests, carried out on a State farm in Azerbaĭdžan SSR regarding this problem, are reported. They have given results which support the authors' theory, that the alkaloid (saponin) in lucerne (notably in the roots) accumulates in the soil on which this crop is grown in an amount toxic to the subsequent cotton crop. In a test in which cotton seed was soaked for 24 hours in saponin solutions of different concentrations and then placed on gauze moistened with water the following results are reported: 88% seedling emergence in control, (seed soaked in water only); 56% emergence after soaking in 0·2 mg./ml. saponin solution; 36% emergence after soaking in 1·0 mg./ml. saponin solution; 24% after 10 mg./ml. solution and no germination after 100 mg./ml. saponin solution.—M.H.

1299 Bederker, V. K. and Joshi, V. K. **Studies in the agronomy of Gaorani cotton. 2. Rotation.** *Indian Cott. Gr. Rev.* 1954, **8**, No. 1, 57-71, bibl. 5, illus. [Cott. Res. Sta., Nanded]

A study was made in 1941-52 of the value for the cotton-growing tracts of Hyderabad of the following rotations: (a) summer sorghum/cotton; (b) summer *Phaseolus mungo* and autumn sorghum/cotton; (c) groundnuts/cotton; (d) summer sorghum/groundnuts/cotton; (e) summer *Ph. mungo* and autumn sorghum/groundnuts/cotton. Special attention was paid to the effects of the rotations on the yield of seed cotton, ginning percentage, 100-seed weight, percentage of cotton crop picked by 15 December and height of cotton plants. Rotations (c), (d) and (e) gave significantly higher yields of cotton, higher ginning percentages and earlier-maturing plants than either (a) or (b). Rotations (d) and (e) (both 3-year rotations) gave significantly higher yields of seed cotton than the 2-year rotation (c). The summer-grown sorghum in rotation (a) gave significantly higher yields of grain than the summer-grown sorghum in rotation (d). The yields of *Ph. mungo* grain and autumn-grown sorghum grain were not significantly different in the different rotations. Rotation (e) gave significantly higher yields of groundnuts than (c) or (d). The highest gross cash returns were given by rotation (e), and the lowest by (a). The general conclusions drawn from the experiment were that the inclusion of groundnuts in the rotation increased the yield of seed cotton and hastened the maturity of the cotton plants, and that the 3-year rotations including groundnuts were preferable to all the 2-year rotations tried.—W.J.B.

1300 Rakitin, Ju. V. and others. [**Physiological changes in cotton plants resulting from topping in autumn by means of chemicals.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **95**, No. 6, 1337-40, bibl. 7. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR, and Bot. Inst., Acad. Sci. Tadžik SSR]

In recent years it has been demonstrated that, equally with summer topping, improved cotton yields are obtained from autumn topping. This consists of removing the tips of the central axis and tips of both the sympodial and monopodial branches. Retarding stem growth by this method produces rapid development and ripening of bolls and increases the yield of raw cotton. However, because of the labour required (50 men per ha. per day) hand topping is considered impracticable. The authors have therefore examined the possibility of topping by chemical preparations; earlier results were reported in *Proc. Acad. Sci. USSR* 1951, Vol. 8, No. 1, p. 117. The most effective preparation is the sodium salt of 2,4,5-T applied as an aqueous solution or as a dust. Normally, an application of 1000 l./ha. of 0·05% solution is adequate, but for aerial spraying 200 l./ha. of 0·3% solution is required. As a dust (ground or aerial application) 50 to 75 kg./ha. of 1% preparation in powdered kaolin or talc is recommended. The effect of chemical topping by spraying with 0·05% solution of 2,4,5-T on the physiological processes of plants (cotton variety 108-F) is reported. The data show the effect: (1) on transpiration (an increased transpiration rate in young leaves near the growing tip produces an irreversible water deficit following treatment); (2) on photosynthesis (intensity of $CO_2$ assimilation, studied by Ivanov's method and expressed in mg./hr. for 100 g. fresh leaves, is greatly suppressed in young leaves at the growing tip (165) compared with control (284), but in older leaves the process is stimulated, being 199 after treatment compared with 74 in control); (3) on catalase activity (oxydizing process in young leaves is lowered, but is unaffected in older leaves); (4) on respiration (intensity is lowered in young leaves). As a result of the dying off in younger parts of the plants following treatment, vital processes in the older parts are stimulated. For example, on the 18th day after treatment which stimulated growth of new bolls, intensity of respiration in the growing bolls was 25 mg. $CO_2$/hr. per 100 g. crude weight, while that of bolls on the control plants was only 16·7. A comparison of the effectiveness of the two systems of topping (manual and chemical) showed that, from an average of 3 replications, cotton yield (kg./ha.) from 250 $m^2$. plots without topping was 4290; with hand topping, 4750; and with chemical topping, 5110.—M.H.

1301 Brown, L. C. and Rhyne, C. L. **Chemical defoliation of cotton. 2. The influence of boll maturity on the defoliability of species and varieties of cotton.** *Agron. J.* 1954, **46,** No. 3, 128-32, bibl. 4. [U.S. Fld Sta., Sacaton, Ariz.]

In greenhouse and field trials, it was shown that the species and varieties of cotton used differed in response to chemical defoliation, but that the amount of defoliation resulting depended in part on the maturity of the plants when the defoliants were applied. In general, varieties of *Gossypium arboreum* defoliated well, regardless of the stage of boll maturity. *G. herbaceum*, on the other hand, defoliated poorly whether the bolls were mature or immature. In this category came also the Dwarf Red Acala and Simpson Red Dwarf varieties of *G. hirsutum*. Defoliation was affected by the stage of boll maturity in the case of most *G. hirsutum* and *G. barbadense* varieties, except for the *G. hirsutum* varieties 4035, Deridder Red Leaf and Fox, which defoliated well, irrespective of boll maturity. *G. barbadense* varieties defoliated as well as commercial Upland varieties where defoliants were applied when the bolls were mature; when the bolls were immature, *G. barbadense* varieties defoliated less well than Upland varieties. It is considered that it may be profitable to evaluate new varieties of cotton according to their response to defoliants.—P.J.B.

1302 Burnett, E. and Fisher, C. E. **Correlation of soil moisture and cotton yields.** *Proc. Amer. Soc. Soil Sci.* 1954, **18,** No. 2, 127-9, bibl. 9. [Texas Agric. Exp. Sta., Spur]

In trials over a 22-year period in Texas, studies were made of the correlation between cotton yields and soil-moisture content at 6 soil depths (at 1 ft. intervals from the soil surface to 6 ft. deep) on 20 April, 20 May and 20 June. The plots used were sown continuously to cotton over the trial period and were on Abilene clay loam soil. Available soil moisture was at a maximum on 20 May and the correlation between cotton yields and soil moisture content was greatest at the 2nd and 3rd feet of soil depth at this date. Slightly lower correlations were found between cotton yields and soil moisture content on 20 June and much lower correlations on 20 April. Cotton appeared to extract most of its moisture requirements from soil depths between 1 and 3 ft.—P.J.B.

1303 Burnett, E. and Fisher, C. E. **The effect of conservation practices on runoff, available soil moisture and cotton yield.** *Proc. Amer. Soc. Soil Sci.* 1954, **18,** No. 2, 216-18, bibl. 2, illus. [Texas Agric. Exp. Sta., Spur]

The studies reported were made in Texas over a 26-year period on plots on Abilene clay loam soil, with slopes ranging from 0·5-1 %. Treatments used were: (a) tillage with rows in the same direction as the slope, (b) tillage on the contour, and (c) tillage on the contour, plus supplementary closed level terraces. Data are given of the amount of rainfall lost as ineffective showers and run-off and of the intensity of rainfall as related to run-off. Following treatment (a), annual run-off averaged 2·75 in., soil moisture in the 1 to 3 ft. soil depths averaged 1·27 in. and cotton yields 117 lb. lint per ac. Following treatment (b), respective figures were 1·95, 1·34 and 146, and following treatment (c), nil, 1·6 and 188.—P.J.B.

1304 Bederker, V. K. **Place effect on economic characters of Gaorani cotton.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 2, 105-124, bibl. 9.

The influence of environment on the performance of the cotton varieties Gaorani 6, Gaorani 6E-3, Gaorani 12 and Jarila in the various cotton-growing regions of Hyderabad State was studied over the period 1942-50. The yields of seed cotton per ac. and the fibre length, fibre weight per inch, ginning percentage, yarn strength and spinning capacity of the cotton were recorded for each variety in each area. Marked differences in the yield and quality of the cotton were observed in the different areas. An attempt is made to explain the differences in terms of environmental factors operating in the different areas of Hyderabad. The zones found to be most suitable for the production of high quality cotton were the north-eastern and central zones of the Gaorani tract.—W.J.B.

1305 PATEL, C. T. and PATEL, G. B. **Long staple Indo-American cotton Type 170.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 1, 27-31, bibl. 3, illus. [Dep. Agric. Bombay State]

The yields from, and the lint-length and spinning quality of, the cotton produced by the two varieties I.A. Type 170 and Co.4-B-40, in the irrigated Deccan Canals area, were compared in 1949-53. The former variety, derived from a *Gossypium hirsutum* × *G. arboreum* cross, gave better yields of seed-cotton, longer lint (1·03-1·08 in.) and higher spinning counts than the latter. At Surat, under rainfed conditions, I.A. Type 170 outyielded the *G. hirsutum* varieties Co.2 and Co.4-B-40 and equalled in yield the improved *G. herbaceum* varieties Suyog and 2087. The lint-length and spinning quality of I.A. Type 170 was superior to any other variety tested. In these trials the lint-length of I.A. Type 170 was 1·03-1·06 in. In large-scale trials I.A. Type 170 yielded 1245 lb. seed-cotton per ac. on black soil with irrigation supplementing rain and 370 lb. seed-cotton per ac. under rainfed conditions in Sabarkantha, Gujarat.—W.J.B.

1306 CHRISTIDIS, B. G. **Seed vitality and other cotton characters as affected by the age of seed.** *Pl. Physiol.* 1954, **29,** No. 2, 124-31, bibl. 27, illus. [Hellenic Cott. Res. Inst., Sindos, Greece]

Three varieties of *Gossypium hirsutum* which differed in crop characters, particularly in size of boll and weight of seed, were studied for effect of age of seed on germination, yield of seed cotton, earliness, ginning out-turn and lint length. The 3 varieties germinated satisfactorily after being stored for 11 years, but the small-seeded varieties maintained a higher percentage germination than the large-seeded variety. Age of seed had no consistent effect on the other crop characters. The work will be continued until the seed has completely deteriorated with age.—D.B.

1307 COOPER, W. E. **The seed-furrow application of fungicides to control cotton stand failures.** *Phytopathology* 1954, **44,** No. 6, 331. [Abstract]

In trials in N. Carolina, 8 organic fungicides were applied as sprays containing 0·5-1 lb. active ingredient per ac., to seed furrows in which acid-delinted, fungicide-treated cotton seed had been placed. Drought, followed by a wet, cold spell, retarded emergence. Treatments with Captan and Thiram resulted in highly significant stand increases. No fungicides affected post-emergence damping-off of seedlings.—P.J.B.

1308 WILLIAMS, F. and HINKLE, D. A. **Performance of certain pre-emergence herbicides for cotton.** *Proc. 6th South. Weed Conf. 1953* 11-14. [Arkansas Agric. Exp. Sta., Fayetteville]

Applications of 6 and 12 lb., each, of DNOSBP and CIPC, 1 and 2 lb. CMU, 6 lb. *N*-1 naphthylphthalamic acid and 8 lb. dichloral urea were made following the sowing of cotton on Richland silt loam in Arkansas on 8 May, 1952. Treatment with 12 lb. DNOSBP and 6 lb. *N*-1 naphthylphthalamic acid significantly reduced cotton stands, compared with untreated controls. All herbicidal treatments resulted in significant control of both grass and broad-leaved weeds. CMU and CIPC were particularly effective against grasses. Cotton seed yields were significantly reduced where *N*-1 naphthylphthalamic acid was applied, only. DNOSBP at 12 lb. per ac., while it reduced cotton stands, did not reduce yields, compared with hoed controls.—P.J.B.

1309 LIVINGSTON, G. A. **CMU as a pre-emergence herbicide in cotton.** *Proc. 6th South. Weed Conf. 1953* 19-22, bibl. 1. [Texas Arts Industr. Coll., Weslaco]

In trials in Texas on land infested with *Amaranthus* sp. and *Sorghum halepense*, CMU at rates of 0·25, 0·5, 1 and 2 lb. per ac. was applied after sowing cotton on irrigated land. Excellent control of *Amaranthus* sp. was secured by using CMU at a rate of 2 lb. per ac., with no injury to the cotton; *S. halepense* was not controlled by any CMU treatment. Under dry conditions, CMU tended to stunt cotton plants.—P.J.B.

1310 McWHORTER, C. G. and HOLSTUN, J. T. **The efficiency of certain pre- and post-emergence herbicides used alone and in combination for weed control in cotton.** *Proc. 6th South. Weed Conf. 1953* 76-82, bibl. 2. [Delta Br., Mississippi Agric. Exp. Sta., Stoneville]

In trials during 1950-2 in Mississippi, pre-emergence treatments with oil-soluble PCP or oil-soluble DNOSBP were combined with post-emergence herbicidal oil treatments with L.H.O. No. 1, Esso 38, Shell ACX 44, or Shell 110. Post-emergence oil treatments were also used without pre-emergence treatments and the pre-emergence treatments were used with conventional cultivation practices. All treatments gave adequate weed control and reduced cultivation requirements for weed control. DNOSBP was slightly more effective than PCP as a pre-emergence treatment. Studies of the economics of the different treatments indicated that there was no economic advantage in using the pre-emergence treatments where the post-emergence oils were applied, compared with where post-emergence oil treatments only, were used. To provide a reasonable margin of safety, it appeared that not more than 3 applications of oil should be used and that none should be used after bark cracks had formed on the cotton stems.—P.J.B.

1311 REA, H. E. **Pre- and post-emergence chemical treatment combinations in weeding cotton.** *Proc. 6th South. Weed Conf. 1953* 88-9. [Texas Agric. Exp. Sta., College Station]

In trials in Texas, the following herbicidal treatments were used to control weeds (mainly *Panicum fasciculatum*, *Echinochloa* sp. and *Amaranthus retroflexus*) : 2·25 lb. DNOSBP, 2·25 lb. CIPC and 4·75 lb. CMU per ac., applied as pre-emergence treatments to a 10-in. band over the rows of cotton seed and 3 post-emergence treatments, including : cultural weed control, 1 and 2 applications of Lion Oil No. 1 and 1 and 2 applications of ammonium nitrate as a herbicidal spray. DNOSBP, CIPC and CMU reduced stands of seedling grasses by 40, 36 and 90%, respectively, while stands of *Amaranthus* spp. were reduced by 83, 50 and 99%, respectively. A single hoeing + cultivation reduced stands of seedling grasses and *Amaranthus* spp. by 89 and 88%, respectively, while the combined use of pre-emergence herbicides + cultivation reduced stands by 95 and 98%, respectively. A single application of herbicidal oil at a rate of 5 gal. per ac. reduced the stands of grasses and *Amaranthus* spp. by 95 and 93%. A second application of oil did not materially increase the degree of weed control. One application of ammonium nitrate (5 gal. solution per ac., containing 6 lb. of ammonium nitrate per gal.) reduced the stands of grass and *Amaranthus* seedlings by 57 and 77%, respectively. Data are given of the economics of these treatments. The herbicides had no material effect on cotton stands, growth, or yields.—P.J.B.

1312 HAGOOD, E. S. and HODGES, R. R. **Pre- and post-emergence weed control in cotton during 1952.** *Proc. 6th South. Weed Conf. 1953* 208-14. [Georgia Agric. Exp. Sta., Experiment]

The results are given of trials at 6 locations in Georgia, in which pre- and post-emergence herbicidal treatments, alone and in combination, were made to cotton. In north Georgia, CIPC and CMU gave the best results among a number of pre-emergence treatments. In south Georgia, CIPC gave the best results. CIPC and CMU had no injurious effect on the cotton, except where CMU at 2 lb. per ac. was used in south Georgia. The most effective treatments in terms of weed control and cotton yields were combinations of 9 and 12 lb. CIPC per ac. applied as a pre-emergence spray + post-emergence treatments with non-fortified oil. Also effective were 2 lb. CMU per ac. as a pre-emergence treatment + 1 lb. CMU per ac. as a post-emergence treatment. Combinations of pre- and post-emergence treatments were superior to any post-emergence treatment used alone.—P.J.B.

1313 HOLSTUN, J. T. and others. **A progress report on four factors involved in the use of post-emergence herbicidal oils in cotton.** *Proc. 6th South. Weed Conf. 1953* 96-105, bibl. 7. [Delta Br., Mississippi Agric. Exp. Sta., Stoneville]

In the first trial, varietal differences in the tolerance of cotton to herbicidal oil were studied. Data are given of the reaction of 15 varieties of Upland cotton to 3 applications of herbicidal oil, each at 10 gal. per ac. The varieties most resistant were : Acala 1517 N. Mex, Hopi Acala 50 and Delfos 9169. In a second trial, studies were made on the effect of the number of plants per hill on the tolerance of cotton to herbicidal oil. Data are given of the response of cotton sown to produce 1, 3 and 6 plants per hill. In both years of this trial, cotton planted at 3, or more, plants per hill was more tolerant to the herbicidal oil than that planted at less than 3 plants per hill. In a third trial, the effect of nozzle setting and type of oil on cotton reaction and weed control was studied. Non-fortified oils caused less injury to cotton than did fortified oils. A lesser degree of weed control and injury to the cotton was obtained where the spray nozzles were directed along the rows, than where the nozzles were directed at right angles to the rows. In a fourth trial, the effect of herbicidal oils on cotton and weeds, as influenced by different physical and chemical properties of the oils, was studied. For oils with a given boiling point, injury to cotton increased as the aromatic content of the oil increased. In most cases, oils with a low boiling point were less toxic to cotton than those with a high boiling point, where other properties were equal.—P.J.B.

1314 REA, H. E. **Chemical control of established Johnson grass in cotton fields.** *Proc. 6th South. Weed Conf. 1953* 40-4. [Texas Agric. Exp. Sta., College Station]

Spray applications of 50 lb. TCA per ac. in autumn resulted in almost complete control of *Sorghum halepense*, growing on cultivated Miller clay soil in Texas. Cotton grown on treated areas in the year following was not affected by the TCA. DNOSBP, CIPC and Alanap 5, applied as pre-emergence treatments to the cotton, controlled 90-95% of *S. halepense* seedlings. Follow-up post-emergence treatments with fortified and unfortified herbicidal oils controlled seedlings which escaped the pre-emergence treatments. For controlling established *S. halepense*, the herbicidal oils were very effective. For controlling *S. halepense* in cotton, application rates of 5 gal. per ac. for the non-fortified oil (Esso 38) and 4 gal. per ac. for the fortified oil (NOHO) were considered suitable.—P.J.B.

1315 BARRONS, K. C. and others. **Experiments on the reduction of high temperature injury to cotton from DNOSBP.** *Proc. 6th South. Weed Conf. 1953* 33-7. [Dow Chem. Co.]

In pot trials, in which DNOSBP was sprayed on the surface of soil in which cotton had been sown, it was evident that severe injury to the cotton was likely where shade temperatures were over 90°F. and where no appreciable rain had fallen between sowing and emergence. The results are given of quantitative determinations of the movement of DNOSBP vapour. In empirical studies on the use of different additives to DNOSBP sprays and supplementary sprays to reduce high-temperature injury caused by DNOSBP, after-spraying with lime ($Ca(OH)_2$) markedly reduced the removal of DNOSBP in the vapour phase from soils and reduced high-temperature injury to cotton. Sodium carbonate and triethanolamine, applied with DNOSBP, had a similar effect. The after-spray lime treatments (50 lb. $Ca(OH)_2$) in 120 gal. water per ac.) did not appear to be very practical. Slightly less effective, but more practical treatments appeared to be the use of sodium carbonate applied with the DNOSBP, or lime dust applied just ahead of the DNOSBP spray band.—P.J.B.

1316 GOODMAN, V. H. **The yield and progeny seedling responses of cotton to treatment with 2,4-D, 2,4,5-T, and MCP.** *Proc. 6th South. Weed Conf. 1953* 47-56, bibl. 1. [Mississippi Agric. Exp. Sta., State College]

In trials in Mississippi, studies were made of the effect on cotton seed yields of applications of 2,4-D and 2,4,5-T, made at 4 growth stages, as follows: (a) seedling, (b) 3-6 squares per plant, (c) early flowering, (d) boll stage. 2,4-D was applied at rates of 0·001, 0·01 and 0·1 lb. per ac., while the other two materials were applied at slightly higher rates. 2,4-D caused most injury to the plants. Applications of 2,4-D at rates of 0·1 lb. per ac. at stages (a), (b), (c) and (d) resulted in yields 16, 33, 32 and 79%, respectively, of the average yields of untreated controls in 1952 while similar rates of treatment with 2,4-5-T resulted in respective yields 64, 91, 83 and 82% of those of controls. Plants treated with 0·001, 0·01 and 0·1 lb. 2,4-D per ac. at stage (a) gave yields 99, 68 and 16% of those of controls, respectively. 2,4-D and 2,4,5-T delayed the maturation of the crop, particularly when applied at an early growth stage. In further trials, applications of 0·025 lb. 2,4-D per ac. were made to fruiting cotton in which the embryo age ranged from nil to 40 days. Data are given of the seedling emergence in soil of seed taken from treated plants. The average emergence of seed from untreated plants was 73%, while the average emergence of seed treated with 2,4-D at all stages of embryo development was 37%. The lowest percentages of emergence were found in seed from plants treated when the embryos were 4-11 days old. The emergence of seed from plants treated when the embryos were 0-3 days old was almost as high as that of controls. The 2,4-D treatments also caused a decreased rate of seedling growth of the emerged seedlings and pronounced growth abnormalities in the seedlings. From these results, it was apparent that contamination of cotton crops by 2,4-D spray drift during the flowering and boll stages may cause damage to the seedling progeny as well as the parent plants.—P.J.B.

1317 BASKIN, A. D. **Effects of 2,4-D on quality of cotton as determined by alkali centrifuge value.** *J. agric. fd Chem.* 1954, **2,** No. 5, 239-40, bibl. 2. [Pl. Pest Contr. Br., U.S. Dep. Agric., Beltsville, Md]

Cotton was sprayed to run-off with concentrations of 2,4-D Na salt ranging from 5 to 500 ppm. at 3 growth stages: (a) when the first 2 true leaves had appeared; (b) at stage (a) and again at flowering; (c) at flowering. Plants sprayed with 5 ppm. concentrations at stages (a), (b) and (c) gave respective lint yields 60·2, 84·4 and 65·2% lower than those of untreated controls. Cotton fibre quality was assessed by alkali centrifuge values. Fibre quality was impaired, in most cases, in direct proportion to the amount of 2,4-D applied, irrespective of date of application. Applications of 5 ppm. concentrations of 2,4-D caused nearly significant reductions in fibre quality, as compared with controls. Treatments with over 50 ppm. concentrations at stage (c) caused the greatest impairment of fibre quality. Treatments with 100, 200 and 500 ppm. concentrations of 2,4-D at stage (a) had smaller effects on fibre quality than treatment with 10, 25, or 50 ppm. concentrations, the reason for which was not apparent.—P.J.B.

1318 PALMER, R. D. and ENNIS, W. B. **The effect of age of cotton upon its response to an herbicidal oil applied as a directed spray.** *Proc. 6th South. Weed Conf. 1953* 106-15. [Mississippi Agric. Exp. Sta., State College]

In studies in Mississippi, post-emergence spray treatments with Lion Herbicidal Oil No. 1 were made at rates of 8 or 17 gal. per ac. every 2-3 days over a period of 66 days. The first treatment at the low rate was made at 14 days after emergence and the first treatment at the high rate was made 29 days after emergence. The sprays were directed at right angles to the rows, with the spray striking the cotton stems at a height of 1 in. above ground. Data are given of the morphological effects on the cotton and the meteorological conditions at the time of spraying. The first treatment causing noticeable damage to the cotton stems was at 29 days after emergence, or 5 days before any bark fissures became apparent. As the amount of rupturing of the epidermis increased, so did the number of plants killed by the oil. Injuries caused by the oil included both stem enlargement and stem constriction. Reasons for these differences are discussed. A high content of moisture in the soil during the time of transition of the plants from stems with waxy cuticle to stems with a corky bark, increased the amount of injury caused by the oil. Cotton with well-suberized bark appeared to be resistant to oil.—P.J.B.

1319 ARNDT, C. H. **Evaluation of fungicides as protectants of cotton seedlings from infection by *Rhizoctonia solani*.** *Pl. Dis. Reptr* 1953, **37,** No. 7, 397-400, bibl. 3. [S. Carolina Agric. Exp. Sta., Clemson]

A sand-culture technique for evaluating seed protectant chemicals and which has the merit of enabling relatively uniform disease-producing potentials of specific pathogens to be used, is described. In trials with a number of materials used for the control of *Rhizoctonia solani* on cotton seed, a significant degree of control followed the use of Na-tetrachlorophenate (Dowicide F), trichlorophenyl acetate (Seedox) and pentachloronitrobenzene (275-D) at respective concentrations of 1 : 80,000, 1 : 20,000 and 1 : 20,000 (active material). —P.J.B.

1320 SWAINE, G. **Insecticide investigations on crops in East Africa.** *Proc. 6th Symposium Colston Res. Soc. 1953. Insect. and Colon. Agric. Devel.* London, 1954, 63-74, bibl. 17. [Dep. Agric., Tanganyika Territory]

The control of the pests of cotton, wheat, maize sorghum, sunflowers and groundnuts in East Africa is discussed, with special reference to Tanganyika. In an experiment at Ilonga in 1951-2 the best control of American boll-worm of cotton (*Heliothis armigera*) was achieved with a 10% DDT/3% BHC dust, applied five times. The yields of seed cotton from the plots so treated were double, or more than double, those from untreated plots; the percentage of grade 1 cotton was also greater from the treated plots. In an experiment in which Aldrin and BHC in various forms was applied to wheat, the best kill of the dynastid beetle (*Heteronychus consimilis*) and the best yields of wheat were obtained with: Aldrin, applied at the time of planting through the fertilizer attachment; BHC-organo mercury as a seed dressing; and BHC as a seed dressing. Various experiments in Tanganyika and Kenya are quoted to show that DDT dust at concentrations of 1-5% can be used to control the maize stalk-borer, *Busseola fusca*. In Tanganyika, where termite damage to sunflowers is serious, 2·6% gamma-BHC dust placed in bands, 2 inches to either side of the seed, at a rate of 40 lb. per ac. improved total establishment by 5000 plants per ac. Sprays of certain organo-phosphorus formulations applied with a wetter gave temporary control of rosette disease of groundnuts.—W.J.B.

1321 CALCAGNOLO, G. and SAUER, H. F. G. Influência do ataque dos pulgões na produção do algodão. [**The influence of attacks by *Aphis gossypii* on cotton production.**] *Biológico, S. Paulo* 1954, **20,** No. 2, 21-31. [Inst. Biol., São Paulo, Brazil]

Two experiments were carried out in 1952-3, (1) to determine the percentage of the cotton crop lost as a result of attacks by *Aphis gossypii* and (2) to test the value of insecticides as means of controlling the pest. In the first experiment, small plots sown in November and treated with a succession of Parathion sprays containing 0·02% active material, were compared with control plots not treated with Parathion. Insects other than aphids were controlled by frequent treatment with Toxaphene and a BHC/DDT/sulphur mixture. The untreated cotton plants were severely attacked while the numbers of aphids counted on the plots treated with Parathion were almost negligible. The yields of seed cotton from plots not treated with Parathion were 44% less than those from plots treated with it. In the second experiment the following different treatments against aphids were applied: (a) thorough spraying of the plants with 0·01% Parathion; (b) 0·01% Parathion spray, applied to the tops of the plants; (c) Systox emulsion spray (2 c.c. of emulsion per litre of water); and (d) control, no anti-aphid treatment. Three applications of Parathion and 2 of Systox were made during the worst period of aphid attack (mid-December to mid-January). Toxaphene was again applied to all plots to control insects other than aphids. The yield of cotton from plots receiving no anti-aphid treatment (d) was 47% less than from those receiving treatment (a), while treatments (b) and (c) gave yields 24% and 16% less than (a). Parathion and Systox are both recommended as effective and economically rewarding sprays for controlling *Aphis gossypii*.—W.J.B.

1322 BIGI, F. Gli ambienti, i parassiti e le malattie del cotone in Africa Orientale (Eritrea, Etiopia, Somalia). [**The environment, pests and diseases of cotton in East Africa (Eritrea,**

**Ethiopia, Somalia).]** *Riv. Agric. subtrop.* 1954, **48,** No. 4-6, 113-29, English summary p. 129.

Control measures are given.—E.B.O.

1323 THIES, S. A. **Agents concerned with natural crossing of cotton in Oklahoma.** *Agron. J.* 1953, **45,** No. 10, 481-4, bibl. 12. [Oklahoma Agric. Exp. Sta., Stillwater]

Studies in Oklahoma were made of the role of wind and insects in the dispersal of cotton pollen in a field of Upland cotton. Wind appeared to be of no importance in effecting cross-pollination. Three species of bumble bee were the only insects found to enter cotton flowers. These species were : *Bombus americanorum*, *B. fraternus* and *B. auricomus*, of which the first was the most active pollinator. They visited an average of 5·15, 4·26 and 3·12 flowers per minute, respectively. Peak bee populations in the cotton field occurred between 9·00 and 10·30 a.m. It was concluded that figures of 25-30% cross-pollination in cotton observed near Stillwater, Oklahoma, were not as high as might have been expected on the basis of the insect activity observed in these studies.—P.J.B.

1324 BLAGOVEŠENSKIĬ, A. V. and KAMILOVA, R. [**The biochemical features of early ripening.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **95,** No. 2, 309-12, bibl. 7 [Princ. Bot. Gdn, Acad. Sci. USSR]

The work contains a citation of many investigations which have been carried out to determine the connexion between ripening in plants and their metabolic processes, notably, enzyme activity. The authors' experiments were designed to study the activity of lipase, proteolytic ferments and respiration energy (as an expression of the aggregate effects of oxidation-reduction ferments) in dormant or germinating seeds of early- and late-ripening types of the Soviet long-stapled cotton, *Gossypium hirsutum*. Under conditions of the tests described, there is evidence of greater activity of lipase in early-ripening varieties compared with late-ripening types. Furthermore, the quality (expressed as a capacity to lower the energy which activates proteolysis) of proteolytic ferments in dormant seeds of early-ripening varieties is greater than in late-ripening types. The intensity of respiration in dormant seeds (determined by the manometric method of Smirnov and Čigirev) is greater n early-ripening varieties. It is concluded that, n very early stages of development, cotton plants may be distinguished as early- or late-ripening types by these metabolic processes.—M.H.

325 GAUSMAN, H. W. and COWLEY, W. R. **Effect of ammonium-nitrate on the defoliation of immature cotton leaves.** *Agron. J.* 1954, **46,** No. 3, 140, illus. [Lower Rio Grande Valley Exp. Sta., Weslaco, Tex.]

A note is given on defoliation of immature cotton leaves in pot experiments, in which 50 or 100 lb. of additional N were applied per ac. as a spot-placing at the time of squaring. There was evidence that defoliation following this treatment was caused by excessive contents of ammonia in the leaves, derived from the ammonium nitrate used, though it was not known whether defoliation resulted from direct toxicity by ammonia, or from a by-product created by the presence of excess ammonia.—P.J.B.

1326 LANE, H. C. **Defoliation of cotton.** *Iowa State Coll. J. Sci.* 1954, **28,** No. 3, 355. [Abstr. Doct. Theses]

In field and greenhouse studies, studies were made of the nature of chemically-induced leaf abscission in cotton plants. Where the leaves were immature, defoliant treatment caused 20% less leaf fall than where the leaves were mature. In the field, any circumstance which caused the plants to make excessive growth, or to set fruit irregularly, reduced defoliant effectiveness. Complete defoliation was secured only where the plants were fruiting heavily and were mature. Induced abscission had a $Q_{10}$ of about 2 in temperatures of 20-30°C., a $Q_{10}$ greater than 2 in temperatures of 10-20°C., while at temperatures of 5°C., defoliants had no apparent effect on abscission. Induced and natural leaf abscission appeared to be similar. Certain anti-auxins were ineffective in promoting leaf abscission, evidence that lack of auxin does not fully explain leaf fall.—P.J.B.

1327 O'KELLEY, J. C. and CARR, P. H. **An electron micrographic study of the cell walls of elongating cotton fibers, root hairs, and pollen tubes.** *Amer. J. Bot.* 1954, **41,** No. 3, 261-4, bibl. 15, illus. [Univ. Alabama, Tuscaloosa, and Iowa State Coll., Ames]

The evidence of the possible formation of microfibres of cell walls from shorter units is discussed. [The root hairs and pollen tubes mentioned in the title are of *Raphanus sativus* and *Bignonia capreolata*, respectively.]—D.B.

1328 IYENGAR, R. L. N. **A method for the determination of the strength of attachment of the fibre to the seed and its effect on the ginning behaviour of different cottons.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 1, 8-26, bibl. 6, illus. [Technol. Lab., Matunga, Bombay]

An apparatus for measuring the strength of attachment of cotton fibre to the seed is described. *Gossypium barbadense*, *G. hirsutum*, *G. herbaceum* and *G. arboreum* varieties were tested, using the apparatus, and the numbers of seed fragments broken off when the fibres were removed from the seeds were noted. The species of *Gossypium* mentioned above are arranged in ascending order of strength of attachment of the fibre to the seed. The number of seeds from which seed-coat fragments were removed during the tests, per 25 seeds tested, were nil, 7·1, 8·5 and 14·8 for *G. barbadense*, *G. herbaceum*, *G. hirsutum* and *G. arboreum*, respectively. Among the *G. hirsutum* varieties the number of seeds with seed-coat fragments removed per 25 seeds was especially high in the case of the Coimbatore varieties Co. 2, Co. 3 and Co. 4 (14, 18 and 14, respectively), but the removal of seed-coat fragments with the fibres occurred much less frequently in the case of the newer varieties bred at Coimbatore.—W.J.B.

1329 BHAND, D. Y. and KALAMKAR, R. J. **Study of the effect of ammonium sulphate on cotton in Madhya Pradesh.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 2, 101-4. [Dep. Agric. Madhya Pradesh]

The results are reported of trials on 112 plots on cultivators' holdings in different parts of Madhya Pradesh. The trials were carried out in 1950-1 to test the effect of the government-sponsored distribution of ammonium sulphate to cultivators. The average response of the cotton to ammonium sulphate was approx. 100 lb. extra yield of seed cotton per ac. ; the average yield of the unmanured plots was about 321 lb. The quantity of ammonium sulphate applied per ac. varied from 80-112 lb. In general, the response of cotton yields to ammonium sulphate was greater on the more fertile (as measured by the yield of the unmanured plots) than on the less fertile soils.—W.J.B.

1330 EMPIRE COTTON GROWING CORPORATION. **Progress reports from experiment stations. Season 1952-3.** London, 1954, pp. 21. [Tanganyika Territory, Lake Prov.]

INVESTIGATIONS REPORTED :

1. Resting-crop trials, pp. 4-6. In one trial [see Abs. 341], in which the effect on second indicator crops (cotton and bulrush millet) of various types of land-resting was tested, there was little difference between the effect of tumble-down fallow and that of planted fallow on the indicator crops although all fallows gave significantly better yields of indicator crops than did annual cropping with removal of residues. In a similar trial, in which first indicator crops were compared, the yields of cotton after a tumbledown fallow were similar to those after continuous cropping with applications of either farm-yard manure or phosphates. The best yields of millet were obtained after continuous cropping with additions of farm-yard manure and after a planted fallow undersown with *Tephrosia* sp. and *Crotalaria* sp.
2. Manurial trial with cotton, pp. 7-8. The effect of no manure, compost at 2 rates, farm-yard manure at 2 rates, and cotton seed ash at 1·5 ton per ac. applied in 1944, on the ninth indicator crop (cotton), was tested. Plots treated with cotton seed ash and 7 ton per ac. farm-yard manure, respectively, yielded 1424 and 1237 lb. per ac. seed cotton; unmanured plots yielded 992 lb. per ac.
3. Manurial trials with cotton on cultivators' holdings, pp. 9-10. Double superphosphate at 90 lb. per ac. was applied and on half the holdings portions of the areas dressed with superphosphate were top-dressed with sulphate of ammonia at 200 lb. per ac. Over all the tests the mean increase in yield, compared with no treatment, was 145 lb. per ac. seed cotton from the superphosphate application with an additional 206 lb. per ac. where a top-dressing of sulphate of ammonia was added.
4. The effect of ridging and tying on yields of maize and millet, pp. 10-11. Good ridges, tied, gave increases of yield, compared with poor ridges, untied, of 355 lb. seed cotton per ac. (48%) and 100 lb. millet per ac. (10%).
5. Attempted control of bacterial blight (*Xanthomonas malvacearum*) in cotton by seed treatment, pp. 17-18. All treatments, Perenox, Cupromax, Perecot, Spergon, Agrosan and sulphuric acid, gave marked decreases in the incidence of the disease in cotton plants 6-7 weeks after emergence. The incidence was least in plants from seed treated with sulphuric acid. Total yields of seed cotton were not significantly increased as a result of seed treatments.—W.J.B.

## FLAX

1331† POELT, H. and HRABOWSKI, W. Zur mikroskopischen Feststellung von *Ricinus* in Leinsaatrückständen. [**Microscopic determination of castor-oil seed in flax-seed residues.**] *Z. Pflbau* 1954, **5,** No. 2, 92-4, illus. [Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz]

Small portions of the seed of *Ricinus communis* are detected by microscopic examination of a strip of the epidermis of the seed coat, which shows the characteristic irregular thickening, and of the endosperm in which the cells are twice as large as in flax seed. Detection of *R. communis* is important because of the toxicity of castor-oil seed when used for fodder. It is noted that small fractions of the seed of *R. communis* (Euphorbiaceae) can be mistaken for seed of the Chenopodiaceae because of the similarity of the epidermal cells, but in the latter, the middle lamella of the cell wall is distinctly thicker.—D.B.

1332 GIROLAMI, G. **Leaf histogenesis in *Linum***

***usitatissimum.*** *Amer. J. Bot.* 1954, **41,** No. 3, 264,-73, bibl. 45, illus. [Coll. For., Syracuse 10, New York]

The investigation was undertaken to provide a background for a comparative study of the anatomical effects induced in the leaves of *Linum usitatissimum* (variety Punjab) inoculated with the curly-top and aster-yellows viruses. A study of leaf histogenesis in healthy shoots was necessary because of the reported occurrence of virus in meristematic plant tissues. The study deals with the architecture of the apical meristem, initiation and apical growth of the foliage leaf primordium, vascularization of the leaf primordium, lamina differentiation, and vascular differentiation within the midrib vein.—D.B.

### KENAF

1333 WHITTEMORE, H. D. and COCKE, J. B. **Mechanization of kenaf [*Hibiscus cannabinus*] fiber production.** *Agric. Engng, St. Joseph, Mich.* 1954, **35,** No. 7, 488-91, illus. [Agric. Engng Res. Br., U.S. Dep. Agric.]

## OIL CROPS

### SESAME

1334 TOCQUIGNY, J. R. and LIVINGSTON, G. A. **Weed control tests in sesame.** *Proc. 6th South. Weed Conf. 1953* 160-4. [Texas Coll. Arts and Industr., Weslaco]

In trials in Texas to control weeds in sesame [*Sesamum indicum*], applications of CMU, MCPA, Crag Herbicide No. 1, Alanap 1, Alanap 5 and Endothal were made as pre-emergence treatments. Crag Herbicide 1 and Alanap 2 were applied at emergence and also when the crop was in the 4-leaf stage. In the pre-emergence treatments, CMU at 0·17 and 0·34 lb. per ac. gave 46 and 75% control of broad-leaved weeds (mainly *Amaranthus* spp.), respectively ; with Crag Herbicide 1, respective weed control after applications of 1·3 and 2·6 lb. per ac. was nil and 54%. CMU had no apparent effect on the crop, while Crag Herbicide 1 caused slight stunting. Following the other treatments, stunting was severe. In the post-emergence treatments, Crag Herbicide 1 was more effective in controlling weeds than was Alanap 2, though Alanap 2 had a greater growth-inhibiting effect on those weeds which survived treatment than did Crag Herbicide 1. The effect of Alanap 2 on the crop was more deleterious than Crag Herbicide 1. At harvest, plants from treated plots were almost as large, or as large, as those on control plots. Sesame yields were not apparently affected by the treatments.—P.J.B.

### LINSEED

1335 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Home-grown linseed.** *Adv. Leafl. 388. England and Wales. Minst. Agric. Fish.* 1953, pp. 4.

1336 FLOR, H. H. **Time of sowing and yield of flax [linseed] varieties.** *Bi-mon. Bull. N. Dak. agric. Exp. Sta.* 1954, **16,** No. 5, 174-81, illus.

Data are given of the effect on seed yield of sowing 12 linseed varieties at 2-week intervals from 25 April to 7 July during 1948-53 at Fargo, N. Dakota, and on the effect of different sowing dates on the time taken to mature 10 varieties. Of the varieties sown during the period 25 April-15 May, B5128 and Victory gave the highest average yields of 22·1 and 21·4 bu. per ac. Of varieties sown between 16 May and 5 June, Sheyenne, Victory, Dakota and B5128 gave respective average yields of 19·1, 18·8, 17·7 and 17 bu. per ac. For sowings made during 6 June to 20 June, Sheyenne and Viking gave the highest yields of 16·3 and 12·2 bu. per ac., respectively, followed by Bison, Victory and Dakota, all with 11·6 bu. per ac. Of varieties sown very late, from 21 June to 7 July, Sheyenne, Bison and Dakota gave the highest average yields of 9·4, 5·8 and 5·8 bu. per ac., respectively. Of these varieties, Bison, Dakota and Sheyenne are early, rapid-maturing varieties, Victory and Viking are intermediate, while B5128 is a late, slow-maturing variety. Redwood, a variety similar to B5128 gave very high yields during 1951-2 when sown early.—P.J.B.

### SUNFLOWER

1337 ROBERTS, J. A. **Trials with sunflower varieties.** *J. Dep. Agric. Vict.* 1954, **52,** Pt. 5, 221-5, illus.

Trials at 2 localities in Victoria in 1948-52 to compare the yields of seed from dwarf, semi-dwarf and giant varieties of sunflower, grown at distances between plants of 6 and 18 in., are described. The following varieties were used: giant, Black and Grey ; semi-dwarf, Mars, Jupiter and Pole Star ; dwarf, Mennonite, Advance and Sunrise. At Cobram, the giant and dwarf varieties yielded an average of 7·3 and 3 cwt. per ac., respectively. The giant varieties yielded best at the greater, and the dwarf varieties at the smaller, plant distance. At Mossiface in 1949-50, giant varieties yielded 14·4 and 18·6 cwt. per ac. of seed at 6 in. and 18 in. spacings, respectively ; at the same spacings dwarf varieties yielded 9·2 and 7·7 cwt. per ac., respectively. In 1950-2, birds destroyed the giant sunflower crop which matured later than the dwarf crop. There was no significant difference between the yields of the semi-dwarf group of varieties and the dwarf group. Among giant varieties, Black outyielded Grey, and, among dwarf varieties, Sunrise was consistently outyielded by the other two varieties.—W.J.B.

1338 WEINSTEIN, L. H. and others. **Chelates. Absorption and translocation of ethylene diaminetetraacetic acid by sunflower plants.** *J. agric. fd Chem.* 1954, **2,** No. 8, 421-5, bibl. 13, illus. [New Jersey Agric. Exp. Sta., New Brunswick]

Experiments, using solution cultures, were made to study the absorption and translocation of ethylenediamine tetraacetic acid, a chelating agent, by *Helianthus annuus* plants. In split-root-system studies, solution cultures with pH values of 5 and 7 were used. One half of the root system was grown in solutions containing $FeSO_4$ and the other half in solutions containing no Fe, but which were supplied with disodium ethylenediamine tetraacetate. In whole-root studies, solutions with pH values of 5 and 7 were used and they contained either $FeSO_4$, or $FeSO_4$ + disodium ethylenediamine tetraacetate In both the split-root and whole-root trials at pH 5, the use of the chelating agent caused only slight increases in plant growth ; at pH 7, the use of the chelating agent markedly increased plant growth and resulted in a relatively higher Fe content in the plant tissues. It was concluded that ethylenediamine tetraacetic acid, or a decomposition product, is readily absorbed by sunflower roots and that chelates activated iron in the plant and transported it to the sites of enzyme synthesis. The exact nature of the activation of inactivated or precipitated iron by chelating agents is not known. $FeSO_4$ supplied to one-half of split-root systems was absorbed by the roots, but the iron was inactivated in the tissues ; disodium ethylenediamine tetraacetate supplied to the other half of the root system apparently chelated this iron, rendering it available to the plant.—P.J.B.

## RAPE

1339 EIFRIG, H. Echtheitsuntersuchungen bei *Brassica* und *Lactuca* im Laboratorium. [**Laboratory investigations of purity in *Brassica* and *Lactuca*.**] *Proc. int. Seed Test. Ass.* 1953, **18,** No. 2, 167-79, bibl. 23, illus. [Samenprüfstelle Münster, Germany]

Observations are given on methods of distinguishing between summer and winter oil-seed rapes and different varieties of horticultural Brassicas by means of the morphological characteristics of the cotyledon and primary leaves, and, in the case of the oil-seed rapes, of the hairs at the leaf edges. Summarized data are given of the 1000-seed weight of the different species and varieties of Brassica.—P.J.B.

1340 RHEIN, W. v. Uber die Bedeutung der Honigbiene für die Saatzuchtwirtschaft. [**The importance of the honey bee for seed production.**] *Saatgutwirtschaft* 1954, **6,** No. 2, 30-2, illus.

Honey bee populations, at the rate of 4 populations per hectare, were placed in seed-production fields of rape and red clover, respectively, and were encouraged to visit the flowering crops by means of what is described as "scent guidance". This means that sugared water was placed at the hive openings or in flat, shallow pans in the field and covered with flowers of the plants to be visited. The seed yield was greatly increased, in comparison with the control fields, by this device ; in the rape fields by 21, 38·9, and 22·8%, in the red clover by 32·2, 51·5 and 85%.—G.M.R.

## GENERAL

1341 FRANÇOIS, Th. and BLEICHER, G. Méthode rapide de dosage de l'huile dans les graines oléagineuses. [**A rapid method for estimating oil in oil seeds.**] *C.R. Acad. Agric. Fr.* 1954, **40,** No. 8, 314-16, bibl. 3. [Fac. Pharm., Univ. Nancy]

# LAND USE, SURVEYS AND MANAGEMENT

1342 PROTHERO, R. M. **Some problems of land use survey in Nigeria.** *Econ. Geogr.* 1954, **30,** No. 1, 60-9, illus. [Univ. Ibadan, Nigeria]

1343 † POWERS, W. L. **Soil and land-use capabilities in Iraq. A preliminary report.** *Geogr. Rev.* 1954, **44,** No. 3, 373-80, illus. [Oregon Agric. Exp. Sta., Corvallis]

1344 † EYRE, V. E. F. and others. **Agriculture, forests and soils of the Jur ironstone country of the Bahr el Ghazal Province, Sudan.** *Bull. 9. Minist. Agric. Sudan Govt* 1953, pp. 40, maps, P.T. 20 or 4s. [Received June, 1954]

1345 MCCALL, A. G. **A note on the agriculture of the Azande.** *Bull. 2. Minist. Agric. Sudan Govt* 1950, pp. 18, P.T. 5 or 1s. [Received June, 1954]

1346 † SIMONNEAU, P. La végétation des sols salés d'Oranie. Les groupements à *Atriplex* dans les plaines sublittorales. [**The vegetation of the saline soils of Oran. The *Atriplex* associations in the sub-littoral plains.**] *Ann. Inst. nat. Rech. agron., Paris. Ser. A. Ann. agron.* 1954, **5,** No. 2, 225-57, bibl. 7, illus. [Serv. Études Sci. Appl. Hydraul., Algeria, N. Africa]

The soils of the sub-littoral plain of Oran can be easily cultivated because of their permeability, high content of assimilable potash salts and low content of chlorides ; they have been used for a variety of crops. However, soils which support a natural vegetation of *Atriplex* are always in danger of becoming too salty and many failures have been experienced, especially with irrigated crops where drainage was not carried out. An analysis of the natural vegetation reveals the species which indicate the potential salt toxicity of the soil. The analysis has been made on the Zürich-Montpellier system. There are two sub-associations dominated respectively by *Atriplex halimus*, in which there are 4 facies, and *A. hastata*, the former being more suitable for agriculture. Orchard, market garden, industrial, cereal and forage crops are recommended for each soil type. All of these soils are suitable for pasture and for cultivation of barley, oats and rice.—D.B.

1347† HAAN, J. H. de and HENDRIKS, J. A. H. **Lelydorp Project—a pilot scheme for land development in Surinam [Dutch Guiana].** *Neths J. agric. Sci.* 1954, **2,** No. 2, 120-33, bibl. 8.

The Lelydorp Project of land development begun in 1950 covers a productive area of about 450 ha. near Paramaribo, Dutch Guiana ; its ultimate purpose is to demonstrate the agricultural and economic possibilities of the medium-sized holding in the Old Coastal Plain. The geology, soil types, land use possibilities, natural drainage, vegetation and agricultural history of this sparsely populated region are described. Most of the Project area is now under perennial tree crops but there are 73 ha. under field crops and 65 ha. under pasture. Among the crops suitable for the region are soyabeans, groundnuts, peas, sweet potatoes, rice and fodder grasses. The project includes research plots and a model farm. The aim is to establish mixed holdings of about 10 ha. The holdings are kept under central management for the first year after planting. During the initial years, when profits are low, the farmers receive wages. Marketing of produce is carried out by the Project authority.—W.J.B.

1348† GROOTEN, R. Aperçu de la situation de l'agriculture belge en 1953. [**A survey of the Belgian agricultural situation in 1953.**] *Rev. Agric., Brux.* 1954, **7,** No. 5, 574-637. [Econ. Serv., Minist. Agric., Belgium]

The survey consists of tabulated data on the weather in 1953, crop yields, animal production, exports, prices in the agricultural market and financial returns. In 1953, agricultural production in Belgium reached a higher level than ever before. —D.B.

1349† WAVER, J. C. **Changing patterns of cropland use in the Middle West.** *Econ. Geogr.* 1954, **30,** No. 1, 1-47, illus. [Geogr. Dep., Univ. Minnesota]

An analysis is given of the dynamic aspects of the competitive relations between crops in the region studied, on the basis of assessments of the acreages of individual crops and combinations of crops. The paper is extensively illustrated by maps.—P.J.B.

1350 GENTILLI, J. **Present climatic fluctuations in Western Australia.** *W. Aust. Nat.* 1952, **3,** No. 7, 155-65. [Nedlands, W. Australia] [Received 1954]

Changes in the geographical distribution of certain plant spp. have drawn attention to the possibility of a change having taken place in natural conditions. Studies were made of the rainfall records of widely distant places from 1877 onwards and of temperature records from 1876 onwards, which prove that the climate of Western Australia has undoubtedly changed. Maps showing the climate for each year since 1928 are presented, the classification being Koeppen's.—G.M.R.

1351† DE FINA, A. L. Progreso registrado en la República Argentina en materia de meteorología agrícola. 1947-agosto-1953. [**Progress in agricultural meteorology in Argentina 1947-53.**] *Rev. Fac. Agron. Eva Perón* 1953, **29,** 2a, 165-80, bibl. 85.

Methods of obtaining and collating agrometeorological data in Argentina are described. A bibliography is provided of literature on climate in relation to ecology and agricultural production in Argentina.—W.J.B.

1352† TIMOŠENKO, V. P. **New Soviet economic plan : its agricultural aspect.** *J. polit. Econ.* 1953, **61,** No. 6, 489-508.

The factors which have determined output in the Soviet agricultural industry during the operation of the 1946-50 plan are discussed. While the sown area assigned to industrial crops (12·2 million ha.) slightly exceeded the target of 11·8 million ha., the area under grain crops was only 102·6 million ha. (compared with an estimated 105·8 million.) The area under fodder crops was 14·2 million ha. (while the target was 17·9 million). The introduction of crop rotations was far from adequate at the end of the 4th plan and this, in turn, adversely affected the plan for expansion of animal husbandry during 1946-50. To offset these failures, subsequent schemes have been evolved for the construction of shelterbelts, irrigation development (especially of lands outside the traditional area of irrigated farming) and the enlargement of collective farms (for the socio-economic purpose of tightening government control over farmers). It is maintained that the ambitious plan to increase agricultural output by 50-60% in 1951-55 must be achieved by increasing yields per hectare rather than by expanding crop areas. A system of barter between State organizations and the collective farms requires a huge increase in the production of goods required by the farm population. "The sale of kolkhoz [collective farm] products in kolkhoz markets at inflated market prices, which the urban population is prepared to pay, is still regarded by the government as an important incentive to farmers to expand their production. As long as government employees receive salaries which they may spend in markets where consumers' goods are only scarcely supplied, they will be prepared to pay inflated prices to farmers for food. The scarcity of consumers' goods, preventing as it does the introduction of a direct and just barter between the State and the collective farms, at the same time creates favourable conditions for maintenance of inflated prices in kolkhoz markets, and these are usable as an incentive to farmers."—M.H.

1353† STAMP, L. D. **The under-developed lands of Britain.** *Soil Ass. Albert Howard Mem. Lecture 1954* 1-15. [London]

Aspects of the problem of maintaining and improving agricultural production in Britain were discussed. In connexion with the encroachment of town and industrial building on agricultural land, which accounted for a loss to agriculture of over a million acres in the period 1907-47, the concepts of the Potential Production Unit and the Potential Production Stock Unit were introduced with a view to providing a ready means of assessing the agricultural value of land which is in danger of being used for industrial purposes. One acre of land classified by the Land Utilization Survey as "good general purpose farmland" is equivalent to 1 Potential Production Unit, and other types of land are similarly assessed in terms of Potential Production Units. Thus the potential production value of 5000 ac. land required for building may vary from 10,000 P.P.U. if it is first-class agricultural land to 500 P.P.U. if it is "poor quality light land." One Potential Production Stock Unit is taken to be equivalent to 1 mature bullock. 1 P.P.U. is equivalent, in terms of animal-carrying capacity, to 0·4 P.P.S.U. It is suggested that when alternative sites for building purposes are being considered their relative value in terms of P.P.U. should be taken into consideration. The following types of land in Britain which can be classified as underdeveloped are specified: (a) land, often already regarded as productive, which can be improved in soil-texture by marling or the addition of sand, (b) land where soil-structure can be improved by better management, (c) hill pastures which can be improved by draining, liming and reseeding, (d) mountain moorlands which can be afforested, (e) tidal land suitable for reclamation, estimated by the speaker to amount to 100,000 ac., (d) light coastal sands where soils may be built up by suitable cropping.—W.J.B.

## FARMING SYSTEMS AND PRACTICES

1354† ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Irrigation. With notes on crops to which it is applicable.** *Bull. 138. England and Wales. Minist. Agric. Fish.* 2nd edn, 1954, pp. iv + 48, illus., maps 4, London; H.M.S.O., 3s.

1355† NAGLE, A. **Irrigation practice in Queensland.** *Qd agric. J.* 1954, **78,** No. 3, 125-32, illus.

The merits, disadvantages and costs of 3 types of irrigation, namely, spraying, border and furrow irrigation, are discussed. The portable spraying system is for porous sandy soils, for steep slopes and uneven land. Owing to high operational as well as high capital costs it is profitable only for crops giving high returns per acre. It is useful as an occasional supplementary water supply in regions of high rainfall. The border method is for heavy, relatively impervious soil. The initial cost of surveying and grading of land and making head ditches and tail drains is high but operating costs are low. It is suitable for pastures and for producing hay, lucerne and other fodder crops and cereals. The furrow irrigation system is suitable for a variety of soil types and a slight gradient, 1 to 4 in. per chain, being ideal. The layout is less costly than that required for the border system. It is not suitable for steep gradients, and, where the slope permits, it is suitable for irrigating large areas of fodder crops and row crops such as cotton, maize, tobacco and for sugar-cane and orchards.—D.B.

1356† ROMANO, E. and CARULLO, M. Misure di umidità del terreno nella irrigazione a pioggia. Nota 1. [**Measures of soil moisture in sprinkler irrigation. Note 1.**] *Ann. Sper. agr.* 1954, **8,** No. 2, 629-53, bibl. 7, illus. [Sta. Chim.-Agr. Sper., Roma]

An investigation, intended to last for several years, was started in 1952 to study the use of water in sprinkler irrigation, under the same climatic conditions and with the same crops (including lucerne and seed maize) but on different types of soil. Preliminary results are given from the 1952 trials carried out on a compact clay-alluvium soil in the Tiber valley.—E.B.O.

1357 TURCK, G. and WHITE, J. E. **Small scale irrigation in Southern Rhodesia.** *Rhod. agric. J.* 1954, **51,** No. 1, 45-81, illus. [Dep. Irrig. S. Rhodesia]

Methods of irrigating small tracts of land on individual farms are described in detail. The following estimates of the irrigation requirements of crops in S. Rhodesia are made: winter cereals, 3 in. every 14 days: maize, 3 in. every 14 days; potatoes, 2 in. every 5-7 days; lucerne, 3-5 in. every 14 days. In the case of potatoes, the full rate of irrigation should be applied from the time of planting. The bearded wheat variety Punjab 8A is recommended for irrigated conditions. Details are given of the capital and operating costs of small-scale irrigation.—W.J.B.

1358† WILLS, B. C. **Schemes for the improvement of African farming in Northern Rhodesia.** *Trop. Agric., Trin.* 1954, **31,** No. 3, 205-13.

Two schemes are described; the first, an Improved Farming Scheme for the maize-growing areas of the Southern and Central Provinces, the second, a Peasant Farming Scheme for backward areas where shifting cultivation is practised. The first scheme is designed to improve existing maize-growing practices and involves the payment of graded bonuses according to the type of rotation adopted. The rotations designated as first-, second- and third-grade rotations, respectively, are: maize manured with 5 tons farmyard manure per ac./sunnhemp ploughed in/maize receiving fertilizers/groundnuts or other legume; maize manured as above/groundnuts or other legume/maize manured as above/groundnuts or other legume; maize manured as above and receiving artificial fertilizers/maize manured and fertilized/legume/maize. It is calculated that maize yields on first-grade farms are double those on traditionally run holdings. The average acreage of the registered improved farms receiving bonuses is 17 ac. There is a tendency for farmers receiving bonuses to increase the size of their holdings to compensate for the reduction of effective maize acreage per farm involved in the scheme. The scheme allows for the provision, by means of loans and subsidies, of water-points for cattle, ox-carts to replace sledges, farm-buildings and fertilizers. The Peasant Farming Scheme has as its object the settlement of forest dwellers practising shifting cultivation (their numbers are now outstripping the forest resources of the country) on permanent agricultural land. In this scheme, farms were surveyed and laid out on unoccupied land. Water-points were provided, fuel areas and grazing areas were demarcated. Sets of implements are provided on a repayable loan basis and the tenant repays over the course of 10-20 years the cost of starting his farm of 8-20 ac.—W.J.B.

1359† CROWTHER, E. M. and others. **Long period experiments. Ley-arable experiments, Highfield and Fosters.** *Rep. Rothamst. exp. Sta. 1953* Harpenden, 1954, 140-2.

[There is a further report on the ley-arable experiment referred to in Abs. 352.] The effects on test-crops of wheat (first year) and potatoes (second-year test-crop, following wheat) of 3-years' arable cropping and of various types of 3-years' ley, were compared. On one field, the highest average yield of wheat (44·5 cwt. per ac.) was obtained on plots previously under 3-years' arable crops; the yields from plots previously under 3-years' lucerne and 3-years' grass ley, respectively, were 41·8 and 38 cwt. per ac. On another field the plots previously under lucerne gave the highest yield of wheat (41·3 cwt. per ac.) while the plots previously under ley and arable yielded 37·2 and 36·3 cwt. per ac., respectively. There was little difference between the yields of potatoes on the different plots.—W.J.B.

1360 van MAERCKE, D. L'enfouissement direct de la paille et l'importance de la matière organique pour nos terres agricoles. [**The direct ploughing in of straw and the importance of organic matter for agricultural soils.**] *Rev. Agric., Brux.* 1954, **7,** No. 6, 743-62, bibl. 18. [Inst. Agron. État, Gand, Belgium]

The paper is chiefly concerned with problems of soil structure and humus, but also contains tables, taken from literature, giving the effect of fresh straw and decomposed straw on yields of potatoes and sugar-beet.—D.B.

1361† CRAWFORD, W. R. **Specialized small seed production on Marlborough Farm.** *N. Z. J. Agric.* 1954, **88,** No. 5, 449-57, illus. [Dep. Agric., Blenheim, N.Z.]

Farming is described on a holding in the lower Wairau Valley where the summer is dry with much sunshine. The main crops grown for seed each year are: peas, wheat, perennial ryegrass, white clover, onions and broad beans. The main rotation is: pasture 4 to 5 years/peas/wheat/clover for seed or pasture 4 to 5 years/peas/ryegrass for seed. "The certification of perennial ryegrass and white clover under the Department of Agriculture's seed certification scheme is an important part of the farm programme. No seed of a class lower than Pedigree is sown and Government Stock seed is used when available."—M.H.

1362† RADEMACHER, B. Was bedeutet die Weiterentwicklung der Anbautechnik im Acker- und Pflanzenbau für den Pflanzenschutz? **[Of what importance is the further development of cultivation methods for plant health?]** *Z. Pflkrankh.* 1954, **61,** No. 4, 177-84, bibl. 14.

## SOIL AND WATER CONSERVATION

1363† GREENALL, A. F. and HAMILTON, D. **Soil conservation surveys in New Zealand.** *N.Z. J. Sci. Technol.* 1954, **35,** No. 6, 505-17, bibl. 11, illus. [Minist. Works, Palmerston North]

A technique for making soil conservation surveys is described. This has three phases: (a) land inventory mapping, which is the collecting and recording of the physical factors affecting land use; (2) land capability mapping, in which the capability of the land is assessed and the range of uses for each of the land capability classes is discussed; (3) conservation farm plans, which embody a scheme of farm management using the most suitable and profitable practices for each individual farm. Some examples are cited from a conservation survey of the Pohangina district, north-east Manawatu.—Authors' summary.

1364 FISHER, C. E. and BURNETT, E. **Conservation and utilization of soil moisture.** *Bull. 767. Tex. agric. Exp. Sta.* 1953, pp. 40, bibl. 11, illus.

The results are given of 27 years' research at a substation near Spur, on the heavy soils of the Rolling Plains region of Texas, where crop production is mainly dependent on the amount of soil moisture available. Data are given of the effect of slope, crops, tillage and character of rainfall on run-off and erosion on Tillman clay-loam and of the soil moisture content, run-off and cotton yields on Abilene clay-loam with slopes ranging from 0·5 to 2%. The effect of different conservation practices, including terracing and contouring, was studied on plots under continuous cotton. The average annual run-off from 2% slopes during 1926-51 under cotton, grain sorghum, fallow and buffalo grass [*Buchloe dactyloides*] was 3·65, 2·76, 5 and 0·94 in., with average soil losses of 7·2, 3·8, 15·5 and 0·8 tons per ac., respectively. During 1937-52, total available moisture in the top 5 ft. of soil under cotton grown in rows with the slope, in rows on the contour, and in rows on the contour with closed-level terraces, averaged 3·06, 3·33 and 3·72 in. on 20 May of each year, respectively. The application of 20 tons air-dry sorghum litter per ac. increased cotton lint yields from 106 to 228 lb. per ac. on land with a 0·5% slope, with the rows in the same direction as the slope; on terraced and contoured land, the sorghum residues increased lint yields from 331 to 402 lb. per ac. There was a close correlation between cotton yields and the amount of soil moisture stored in the 2nd and 3rd ft. soil depths at the time of sowing. Amounts of 1, 2, 3 and 4 in. of moisture stored in the soil at sowing time were considered to indicate a likelihood of subsequent cotton yields of the order of 89, 187, 330 and 518 lb. lint per ac., respectively. Where the soil was wet to depths of 1, 2, 3 and 4 ft., average cotton yields were 44, 104, 170 and 300 lb. lint per ac. Compared with straight-row sowing, contouring, alone, increased lint yields by an average of 29 lb., while the use of contours with closed-level terraces increased lint yields by an average of 71 lb. per ac.—P.J.B.

1365† HOBBS, J. A. **Replenishment of soil moisture supply following the growth of alfalfa.** *Agron. J.* 1954, **45,** No. 10, 491-3, bibl. 6. [Kansas Agric. Exp. Sta., Manhattan]

In studies on the permanent fertility plots at the Kansas State College, determinations were made of the field moisture contents and approximate wilting points of soil samples taken from depths at 1 ft. intervals up to 25 ft. under soil on which either rotations of 4 years' lucerne or bromegrass [*Bromus inermis*] followed by 12 years' of cereal crops, or 12 years' rotation of cereal crops, followed by 4 years' lucerne or bromegrass were grown. Annual precipitation during the period October 1937 to September 1950, during which the trials took place, averaged 32·38 in., compared with 31·76 in. p.a. for the period 1858-1950. The period during the trials was, therefore, characterized by slightly above-normal precipitation. After 4 years' lucerne, the soil was dry to a depth of 18 ft., moist from 18 to 22 ft. and wet from 22 ft. downward. Under 4 years' bromegrass, the soil was dry to a depth of 4 ft. Under 12 years of cereal cropping, the soil was dry to a depth of 4 ft., moist from 4 to 10 ft., and wet from 10 ft. downward. Since these figures for the 12 years' cereal crops were obtained after a preceding period of 4 years under lucerne, it was apparent that a marked accumulation of soil moisture reserves took place under the 12 years of cereal cropping. It was considered that lucerne could not be considered to be permanently deleterious to the moisture reserves of the subsoil under the climatic conditions prevailing during these trials, provided that a sufficient number of cereal crops are taken between lucerne crops. Moisture reserves under lucerne crops receiving manures were depleted to a greater extent than under lucerne receiving no manures.—P.J.B.

1366 Massey, H. F. and others. **Fertility erosion on two Wisconsin soils.** *Agron. J.* 1953, **45,** No. 11, 543-7, bibl. 3. [Soils Dep., Univ. Wisconsin, Madison]

Studies are reported on the selective removal of total solids, organic matter, total N, nitrate N, P in solution, P extractable at pH3 and exchangeable K in the run-off water from 3 plots in Wisconsin, on Almeda silt-loam with a 3% slope, on Fayette silt-loam with an 11% slope and on Fayette silt-loam with a 20% slope, respectively. The plot on the Almeda soil had been under a maize/oats/hay/hay rotation since 1944, the plots on the Fayette soil with an 11% slope had been under the same rotation since 1941, while the plots on the Fayette soil with a 20% slope were under rotations of maize/oats/4-years' hay, or oats/5-years' hay. Erosion losses on these soils were measured during 1949-51. Erosion losses from plots under hay were negligible, compared with those under oats and maize. The sum of losses during 1949-51 from the Almeda soil under maize and oats was 10,000 lb. soil, 460 lb. organic matter, 26·1 lb. N, 0·81 lb. available P and 5·5 lb. available K per ac. Losses from the Fayette soil with an 11% slope under maize and oats totalled 29,300 lb. soil, 770 lb. organic matter, 42·5 lb. N, 2·6 lb. available P and 7 lb. available K per ac. The losses from year to year varied widely. On the Almeda soil, losses under maize were greater than those under oats in all years ; on the Fayette soil, losses, in most cases, were relatively greater under oats. These differences were thought to be largely due to differences in rainfall distribution between the two soils. The soil under oats was most susceptible to erosion in early spring ; under maize, greatest erosion losses occurred in late spring and early summer. Eroded soil material was 1·1 to 6·7 times more rich in plant nutrients than the soil proper. It was evident that the rotation used on the Fayette soil with an 11% slope was an inadequate protection against erosion. On the third plot on the Fayette soil with a 20% slope, erosion losses under the maize/oats/4-years' hay rotation were about 15 times as great in terms of soil material removed, as under the oats/5-years' hay rotation. Respective losses for the two rotations in 1950 were 112,000 and 4400 lb. and, in 1951, 1100 and 230 lb. per ac. On this soil, the application of 800 lb. 0-20-20 (NPK) manure per ac. in equal annual amounts as top-dressings on the hay, did not increase plant nutrient losses in the run-off water, compared with where all the manure was applied to the cereal in rotations of oats/5-years' hay.—P.J.B.

1367 † Osborn, B. **Rain and erosion.** *Tex. J. Sci.* 1952, **4,** No. 3, 301-24, bibl. 27, illus. [Soil Conserv. Serv., San Angelo, Texas] [Received 1954]

A review is given of the processes of splash and scour erosion of soil, and of factors affecting them.—P.J.B.

1368 † Fredenhagen, V. B. and Doll, E. H. **Grassed waterways. Criteria for their design, construction, establishment and maintenance.** *Agric. Engng, St. Joseph, Mich.* 1954, **35,** No. 6, 417-19. [Soil Conserv. Serv., U.S. Dep. Agric.]

1369 † Gentilli, J. **Estimating potential evapotranspiration in Australia. The search for a formula.** *Res. Rep. 40. Univ. W. Aust. Dep. Econ. Geogr. Lab.* [n.d.], pp. 20, bibl. 33. [John Hopkins Univ. Lab. Climatol., Seabrook, New Jersey, USA] [Received 1954]

1370 Wijk, W. R. van and Vries, D. A. de. **Evapotranspiration.** *Neths J. agric. Sci.* 1954, **2,** No. 2, 105-19, bibl. 15, illus. [Lab. Phys. Met., Wageningen]

The practical difficulties of calculating evapotranspiration using Thornthwaite's and Penman's methods are discussed.—W.J.B.

1371 Robertson, G. W. **Latent evaporation : its concept, measurement and application.** *Pap. read at Wkly Sem. Fld Husb. Soils and Agric. Engng Div., Exp. Fms Serv., Canad. Dep. Agric., Ottawa* 1954, pp. 14, bibl. 18, illus.

The concept of latent evaporation is reviewed. Comparative data are given of the response of black and white Bellani plates, the Piché atmometer, the Summerland and the four-foot water tanks, to daily variations in meteorological factors and the correlation between daily evaporation as measured by these means and that calculated from Penman's equation. The Bellani black plate atmometer is considered to be the best instrument for measuring latent evaporation. Data taken from studies on millet using this method are given and show that it can be used to measure actual evapo-transpiration and to calculate stored soil-moisture in millet crops.—P.J.B.

# WEEDS AND WEED CONTROL

[*Where weeds are specific to a crop see under the crop concerned.*]

1372† ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Thistles and their control.** *Adv. Leafl. 51. England and Wales. Minist. Agric. Fish.* 1953, pp. 5.

1373† HENDERSON, G. **Mechanization of bracken eradication.** *J. Inst. Brit. agric. Engrs* 1954, **10,** No. 3, 33.

1374 THURSTON, Joan M. **Weed studies. Germination and dormancy of wild oat seeds.** *Rep. Rothamst. exp. Sta. 1953* Harpenden, 1954, 71-2.

The experiment with wild oat seeds sown at different depths in 1950 [see Abs. 270] was continued and a new experiment was laid down in 1952. In the first experiment, fewer seedlings of *Avena fatua* and *A. ludoviciana* appeared in 1952-3 than in either of the 2 previous seasons. Less than 4% of the *A. fatua* seeds sown in 1950 and only 0·1-0·3% of the *A. ludoviciana* seeds produced seedlings in 1952-3. Deep-sown plots produced more seedlings in 1952-3 than shallow-sown plots. [In 1951-2 shallow-sown plots produced more seedlings than deep-sown.] Germination on plots ploughed in autumn or spring was similar to that on undisturbed plots, as in the previous year. As also in the previous year frequent harrowing slightly reduced the number of seedlings. In the second experiment, the germination and growth of *A. fatua* was compared on plots left fallow, or sown with wheat, rye or barley in autumn, or with barley in spring. In April, the number of wild oat seedlings was inversely related to the weight of the crop ; the well-established autumn wheat and rye had least, autumn barley more and spring barley still more wild oat seedlings. All the cereal crops reduced the number of wild oat seedling compared with fallow.—W.J.B.

1375† BURKART, A. and CARERA, M. N. Estudios sobre malezas. Morfología vegetativa y germinación del 'Sunchillo' (*Wedelia glauca*). [**Studies on weeds. The morphology of the vegetative parts of *Wedelia glauca* and the germination of its seeds.**] *Darwiniana* 1953, **10,** No. 2, 113-44, bibl. 27, illus., English summary pp. 141-2.

*Wedelia glauca*, a perennial, is a declared noxious weed in Argentina. It is especially troublesome in northern Buenos Aires, Entre Ríos, Santa Fe, Córdoba and the north-western irrigated districts. It is a weed of arable crops, including lucerne, and is toxic to some livestock. The geographical distribution of the weed is described and a list of botanical synonyms and vernacular names is given. The germination of the seeds is low (0-26%) but germination may continue for several months after dissemination. The plant invades agricultural land by means of rhizomes which are short-lived but grow rapidly and are very numerous. The morphology and development of the rhizomes, which are equipped with absorption hairs resembling root hairs, are described in detail. Control is difficult, but frequent cultivations, frequent cutting, treatment with 2,4-D and grazing by animals such as sheep, which are not susceptible to poisoning by the weed, are all recommended.—W.J.B.

1376 CHAKRAVARTI, S. C. and PERSHAD, G. D. **Studies on the viability of immature weed seeds.** *Indian J. agric. Sci.* 1953, **23,** Pt. 2, 153-5, bibl. 2. [Dep. Bot., Agra, India]

The viability of seed from 12 different winter-flowering weeds, collected at various intervals after the opening of the flowers and stored for 7 months in desiccators, was tested. A proportion of the immature seeds of most of the weeds germinated. In the case of *Melilotus indica* and *Anagallis arvensis* the germination percentages of immature and mature seeds were almost the same. In the case of seeds of *Argemone mexicana*, *Lathyrus aphaca*, *Solanum nigrum* and *Vicia hirsuta* there was a progressive increase in total germination percentage with increasing maturity at the time of collection. The immature seeds of *Asphodelus tenuifolius* (collected 20-25 days after the opening of the flowers) had a higher germination percentage than mature seeds collected 30-50 days after the opening of the flowers. A similar lowering in the percentage germination with increasing maturity of the seeds at the time of collection was noted in the case of *Chenopodium album* and *Ch. murale*.—W.J.B.

1377 BUDD, A. C. and others. **Germination of weed seeds. 3. The influence of crops and fallow on the weed seed population of the soil.** *Canad. J. agric. Sci.* 1954, **34,** No. 1, 18-27, bibl. 2, illus. [Soil Res. Lab., Swift Current, Sask.]

Data are given of viable seed numbers per sq. ft. to a depth of 6 in. in soil on 3 plots under fallow/wheat/wheat rotations in the semi-arid region of south-western Saskatchewan. Determinations were made each year during 1937-44, in spring before weed seed germination had begun, and just before the autumn freeze-up. The following species were found, in order of abundance : *Thlaspi arvense*, *Salsola pestifer*, *Sisymbrium altissimum*, *Chenopodium album*, *Amaranthus retroflexus*, *A. albus*, *A. graecizans*, *Descurainia sophia*, *Polygonum convolvulus* and *Lepidium densiflorum*. The species listed after *S. altissimum* were present in very small amounts ; *Th. arvense* was considerably more prevalent than any other species. Where the soil was fallowed, there was, in most cases, a decrease in viable seed numbers from spring to autumn and also during the winter. Viable weed seed numbers increased under wheat crops in all years, except one. Summer fallow was most effective in reducing the viable seed numbers of weeds with a short period of dormancy, such as *S. pestifer*. At all times during the trial period, there were sufficient weed seeds in the soil to produce a thick cover of weed growth.—P.J.B.

1378† MOJA, A. Indagini sui mezzi agronomici di lotta contro l'*Artemisia vulgaris* L. [**Investigations on the agronomical control of *Artemisia vulgaris* L.**] *Ann. Sper. agr.* 1954, **8,** No. 3, 787-800, bibl. 1, illus., English summary p. 800. [Ist. Agron., Univ. Milano, Italy]

Trials were carried out to study the reactions of the following to mugwort (*Artemisia vulgaris*) : wheat grown alone or intercropped with red clover (*Trifolium pratense*) ; grain maize ; lucerne. The crops were sown on plots heavily infested with mugwort. Lucerne was sown in March (normal sowing date) and in April, mugwort being well developed at the latter date. Results showed that, of the crops tested, lucerne only competed successfully with mugwort and, therefore, developed normally. The mugwort plants were reduced in size and number from the first year of establishment of the lucerne ley. [See also *Fld Crop Abstr.* 7 : 639.]—E.B.O.

1379 ELOJA, A. L. **Control of weeds and destruction of diseased abacá plants with herbicides.** *Philipp. Agriculturist* 1953, **36,** No. 10, 474-91, bibl. 11, illus. [Philippine Cent. Agric. Exp. Sta., Laguna]

The herbicides used included : (a) Du Pont 2,4-D amine, containing 49·6% 2,4-D dimethylamine salt, (b) Hi-Ester 2,4-D, containing 50·2% 2,4-D isopropyl ester + 32·6% 2,4-D propylene glycol butyl ether esters, (c) Fernoxone dust, containing 80% 2,4-D sodium salt, and (d) Shell Weed Killer No. 3, a non-selective herbicide containing pentachlorophenol. All materials were applied as aqueous solutions at a rate of 1 l. per 5 sq. m. With cogon grass (*Imperata cylindrica*), up to 3 spray applications of 1, 2 and 3% 2,4-D amine or ester and Fernoxone killed the above-ground parts of the plants, but failed to kill underground rhizomes; the second and third treatments were made to regrowth. Mature cogon grass was clipped, the soil was then worked to loosen it around the rhizomes and the regrowth sprayed when 6-8 in. high. Applications of the same concentrations of herbicides also failed to kill the rhizomes. Spray applications of 0·1, 0·25 and 0·5% 2,4-D ester were made to *Cyperus rotundus* at a rate of 400 ml. per 2 sq. m. of area. Complete control of the weed followed all rates of treatment. In a second trial, applications of 0·1, 0·25 and 0·5% 2,4-D amine, or ester and Fernoxone reduced *C. rotundus* stands by 85-90% on a plot where the weed was well-established. Complete control of a number of weed species was secured by the use of the following minimum spray concentrations of 2,4-D amine and ester : *Tithonia diversifolia* 0·5%, *Lantana camara* 1%, *Ageratum conyzoides* 0·1%, *Synedrella nodiflora* 0·15%, *Elephantopus spicatus* 0·4% and *Triumfetta bartramia* 0·6%. Similar concentrations of Fernoxone gave the same degree of control of all weeds, except *A. conyzoides* and *E. spicatus*.—P.J.B.

1380 ANDREWS, F. W. **Weeds of the Gezira scheme.** *Bull. 13. Minist. Agric. Sudan Govt* 1954, pp. 66, illus., P.T. 25 or 5s.

The weeds dealt with are the commonest weeds of the Gezira. They have been listed alphabetically under their vernacular names and a key to the plants has been included. The detailed drawings (56) were prepared for use in the revised *Flora of the Sudan* which is under preparation.—C.L.S.

1381 PHILLIPS, C. E. **100 weeds—aids to their identification by basal leaf characteristics.** *Misc. Pap. 184. Delaware agric. Exp. Sta.* 1954, pp. 19.

Illustrations of basal leaves, with brief notes on their characteristics, are given for the identification of 100 common grassy and broad-leaved weeds of the north-eastern States of the USA.—P.J.B.

1382† RAUCOURT, M. and VENTURA, E. Une opération à grande échelle de destruction chimique des broussailles. [**A large-scale operation of bush clearance by chemical treatment.**] *Bull. tech. Inform.* 1953, No. 85, 875-81, illus. [Lab. Phytopharm., INRA, Versailles, France]

With a view to controlling the cockchafer on cultivated land, the clearance of hedges and isolated bushes was carried out in 1951 by treatment with a preparation based on the esters of 2,4-D and 2,4,5-T in 5 communes in the Attigny district, Ardennes. Results showed that this preparation should be used as a spray in 1% aqueous solution during the period beginning of June to end of September. The susceptibility of the principal plant species present is described. Elder (*Sambucus nigra*) is destroyed with one application. Hawthorn (*Crataegus oxyacantha*) is resistant. The aerial parts of the blackthorn (*Prunus spinosa*) are destroyed with one application, but its roots grow new shoots. It is therefore recommended that with this species only the stems shorter than 1·5 m. should be treated with this herbicide and that taller plants should be cut and their new shoots treated in the following year.—E.B.O.

1383 FRYER, J. D. **The present role of arboricides in bush and forest eradication.** *Chem. and Industr.* 1954, No. 24, 688-9.

At a meeting of the Agriculture Group of the Society of Chemical Industry, suggested methods of eradicating bush by the use of arboricides were : (a) killing individual trees by direct applications of arsenic or ammonium sulphamate to portions of the trees or by spraying the basal 1-2 ft. of the trunk with 2,4,5-T or 2,4-D esters in oil, (b) killing large trees by overall aerial applications of 2,4,5-T or 2,4-D esters in oil solution or emulsion, (c) destruction of bush by overall aerial applications of 2,4,5-T or 2,4-D followed, if necessary, by burning, (d) destruction of bush by high volume overall applications of ammonium sulphamate, 2,4,5-T or 2,4-D where ground spraying is feasible and large volumes of water are available, (e) destruction of bush by drift spraying using atomiser sprayers; traces have first to be cut through the bush to permit the passage of sprayers, (f) cutting the bush by hand, or mechanically, followed by spray treatment of the cut stumps either individually or by overall application; the latter method would probably demand large quantities of oil and would only be suitable for such areas as roadsides.—W.J.B.

1384 SCHRAMM, D. Die Beziehungen der Ackerunkräuter und ihrer Gemeinschaften zum Reaktionszustand und zur Struktur des Ackerbodens im Gebiete des tertiären Hügellandes. [**The relationship of weeds of arable land and their associates to soil reaction and soil structure in Tertiary hill country.**] *Z. Acker- u. Pflbau* 1954, **97**, No. 4, 485-512, bibl. 24. [Techn. Hochschule, München-Weihenstephan, W. Germany]

The area studied was the north-east part of the South Bavarian plateau, which has areas of mineral- and peat-soils. The former contained the greater number of weed species. On both types of soil the number of weed species was greatest in the winter-cereal stands and least in the root-crop stands.—D.B.

1385 † EBERHARDT, C. Ackerunkrautgesellschaften und ihre Abhängigkeit von Boden und Bewirtschaftung auf verschiedenen Böden Württemberges. [**Weed associations of arable land and their dependence on soil and management: experiments on different soils in Württemberg.**] *Z. Acker- u. Pflbau* 1954, **97**, No. 4, 453-84, bibl. 25, illus. [Landwirtschaftliche Hochschule, Stuttgart-Hohenheim, W. Germany]

A phyto-sociological study has been made in Württemberg of the weed flora of 3 types of crops (cereals, arable fodder crops and root crops) on 3 areas, the soil of each area being of a different geological type. A greater number of weed species, covering a greater area, was found in winter cereal crops than in spring cereal crops, and of the cereals, barley was the most weed-infested. There was, surprisingly, little difference between the weed associations found in the cereal crops and in the root and arable fodder crops. On the other hand, there was a marked relationship between the weed flora and the type and condition of the soil. This relationship is evident from the relative proportions in which the various indicatro species are present in the weed associations. Four main weed associations of crops have been identified. These are, in order of decreasing soil pH: *Caucalis*, *Sonchus oleraceus/Caucalis*, *Scleranthus annuus*, and *Sonchus oleraceus*. The causes of the high weed population of badly managed farms were also investigated. Weeds on such farms are usually large-seeded and perennial. The greater infestation of weeds in badly managed crops is one of greater area covered rather than increase in the number of species.—D.B.

1386 COITEUX, F. Les herbicides en grande culture. [**Herbicides applied to field crops.**] *Rev. Oka* 1954, **28**, No. 2, 25-32. [Ferme Exp. Assomption, Québec]

An account is given of herbicidal trials with various crops. From results with maize for silage it is recommended that the amine of 2,4-D be applied at the rate of 8 oz. pure acid per acre in 7-10 gal. of water, when the weeds are 2-4 in. high and the maize is 10-12 in. high. In trials with sugar-beet, CMU at the rate of 2 lb. per acre gave good weed control leaving 4·3 weeds per sq. ft. (average from 4 counts made at random in the experimental plots), followed by TCA at 12 lb. per acre leaving 5 weeds per sq. ft., and TCA at 10 lb. per acre leaving 7 weeds per sq. ft., compared with 49 weeds per sq. ft. in the untreated control.—E.B.O.

1387 SNYDER, F. W. **Physiological effects of selected herbicides on corn, cotton, soyabeans and certain noxious weeds. A progress report.** *Proc. 6th South. Weed Conf. 1953* 58-60. [Arkansas Agric. Exp. Sta., Fayetteville]

Seeds of maize, cotton and morning glory (*Ipomoea purpurea*) were placed in Petri dishes containing 9 ml. of aqueous concentrations of nil, 1, 10 or 20 ppm. of DNOSBP or CIPC. The seed was incubated at about 30°C. for 72 hr. Observations were made of seed germination, root growth and seedling abnormalities. Cotton seed germination was not affected by 20 ppm. concentrations of either herbicide. Concentrations of 20 ppm. of DNOSBP reduced the germination of maize and *I. purpurea* seed by about 15%, while 20 ppm. of CIPC had no effect on the germination of these species. Root growth of all species was markedly inhibited by 10 or 20 ppm. concentrations of either herbicide. Concentrations of 1 ppm. CIPC and DNOSBP, in contact with seedling roots for 24 hr., markedly reduced root growth in cotton and maize and suppressed the production of secondary roots. —P.J.B.

1388 † GREEN, K. R. **Weed control with chemicals.** 1954, pp. 35, illus. [Dep. Agric., N.S.W.]

A review is given of the more important herbicides and their use in New South Wales.—C.L.S.

1389 STONE, J. D. and SMITH, L. M. **An evaluation of borate and chlorate herbicides.** *Agric.*

*Chem.* 1954, **9,** No. 5, 50-3, 131 and 135, bibl. 14. [Pacific Coast Borax Consolidated, Los Angeles, Calif.]

1390 WALKER, N. **Preliminary observations on the decomposition of chlorophenols in soil.** *Pl. and Soil* 1954, **5,** No. 2, 194-204, bibl. 18. [Rothamsted Agric. Exp. Sta., Harpenden, Herts]

1391 UNITED STATES. **Southern Weed Conference. 6th Proceedings, 1953.** pp. 246.

Among papers presented are the following :
1. A progress report on the pre-emergence use of CIPC, CMU and DNOSBP for weed control in cotton. By J. T. Holstun and C. G. McWhorter, pp. 5-10. Applications of 2 lb. CMU, 9 lb. CIPC and 9 lb. DNOSBP per ac., applied to the soil surface after sowing, all gave effective weed control, when combined with a small amount of hoeing.
2. Performance of certain pre-emergence herbicides for cotton. By F. Williams and D. A. Hinkle, pp. 11-14. [See Abs. 1308.]
3. Pre-emergence weed control in cotton with various herbicides. By W. B. Albert, pp. 15-17.
4. CMU as a pre-emergence herbicide in cotton. By G. A. Livingston, pp. 19-22. [See Abs. 1309.]
5. Some studies on vapour action of certain dinitro compounds upon young cotton plants. By E. B. Hollingsworth and W. B. Ennis, pp. 23-31.
6. The effects of isopropyl N-(3-chlorophenyl) carbamate and an alkanolamine salt of dinitro ortho secondary butyl phenol on the germination, root elongation and root-tip respiration of cotton seed. By C. R. Swanson and others, p. 32.
7. Experiments on the reduction of high temperature injury to cotton from DNOSBP. By K. C. Barrons and others, pp. 33-7. [See Abs. 1315.]
8. The reaction of cotton varieties to pre-emergence herbicides. By E. R. Stamper and others, pp. 38-9.
9. Chemical control of established Johnson grass in cotton fields. By H. E. Rea, pp. 40-4. [See Abs. 1314.]
10. The yield and progeny seedling responses [of cotton] to treatment with 2,4-D, 2,4,5-T and MCP. By V. H. Goodman, pp. 47-56. [See Abs. 1316.]
11. Physiological effects of selected herbicides on corn, cotton, soyabean and certain noxious weeds. A progress report. By F. W. Snyder, pp. 58-60. [See Abs. 1387.]
12. Studies on the downward movement of 2,4-D and 3-chloro-IPC in soils. By R. J. Smith and W. B. Ennis, pp. 63-71.
13. Effect of pre-harvest chemicals upon combine efficiency and milling yield of rice. By D. A. Hinkle, pp. 72-5.
14. The efficiency of certain pre- and post-emergence herbicides used alone and in combination for weed control in cotton. By C. G. McWhorter and J. T. Holstun, pp. 76-82. [See Abs. 1310.]
15. Pre- and post-emergence herbicides for weed control in cotton—1952. By E. R. Stamper and others, pp. 83-7. Data are given of the results of trials on pre-emergence weed control with DNOSBP, CIPC, *N*-1- naphthylphthalamic acid and dichloral urea and on post-emergence treatments with herbicidal oil, CMU, CIPC and DNOSBP.
16. Pre- and post-emergence chemical treatment combinations in weeding cotton. By H. E. Rea, pp. 88-9. [See Abs. 1311.]
17. Comparison of fortified and non-fortified herbicidal oils for cotton. By F. Williams and D. A. Hinkle, pp. 90-3.
18. Control of late season weed and grass seedlings in cotton. By H. E. Rea, pp. 94-5. In trials to compare 4 water-soluble contact herbicides and flame cultivation for controlling young *Sorghum halepense* plants, Premerge (DNOSBP) at a rate of 6·6 quarts in 80 gal. water per ac. resulted in almost complete control following application as a lay-by spray.
19. A progress report on four factors involved in the use of post-emergence herbicidal oils in cotton. By J. T. Holstun and others, pp. 96-105. [See Abs. 1313.]
20. The effect of age of cotton upon its response to an herbicidal oil applied as a directed spray. By R. D. Palmer and W. B. Ennis, pp. 106-15.
21 Post-emergence effects of *N*-1-naphthylphthalamic acid and its derivatives on cotton and certain weeds. By H. E. Rea, pp. 116-18.
22. Performance of certain pre-emergence herbicides for soyabeans. By F. Williams and D. A. Hinkle, pp. 119-21. [See Abs. 1232.]
23. Weed control studies in soyabeans. By W. E. Chappell, pp. 122-5. [See Abs. 1233.]
24. Comparative tests of several herbicides for pre-emergence application to corn. By W. B. Albert, pp. 126-33. [See Abs. 1172.]
25. Weed control in corn. By G. M. Shear and W. E. Chappell, pp. 134-7. In trials in 1950-2, in which a number of herbicides were compared with 2,4-D for weed control in maize, no material was as consistently effective as 2,4-D. Crag Herbicide 1 at 1 and 2 lb. per ac. gave better control of grasses than 2,4-D on sandy soil, with no injury to the maize.
26. The influence of chemicals on weeds and on stands, yield, and percentage sound mature kernels of peanuts when applied as pre-emergence sprays. By V. S. Searcy, pp. 138-9. In trials in Alabama, water-soluble DNOSBP, at rates of 7·5 and 10·5 lb. per ac. and Na PCP at 30 and 60 lb. per ac. controlled weeds in groundnuts long enough to eliminate the need for hand-hoeing. CIPC, CMU and *N*-1-naphthylphthalamic acid were unsatisfactory for weed control. No treatment affected groundnut stands or the percentage of sound kernels.
27. Progress report on weed control in peanuts. By W. E. Chappell and A. H. Allison, pp. 141-2.

Observations are made on trials, using pre- and post-emergence herbicidal treatments for weed control in groundnuts.
28. Herbicidal influences on Dixie Runner peanuts and existing weed populations. By C. C. Helms and E. G. Rogers, pp. 143-9. [See Abs. 1236.]
29. Peanuts—pre-emergence weed control. By W. G. Westmoreland and G. C. Klingman, pp. 150-5. Notes are given on the results of field trials with DNOSBP, 2,4-D butyl ester, DNOSBP + 2,4-D ester, PCP, SES, CMU, a chlorinated ketone, and CIPC.
30. Weed control tests in sesame. By J. P. Tocquigny and G. A. Livingston, pp. 160-4. [See Abs. 1334.]
31. Comparative efficiency of several herbicidal treatments in control of nutgrass. By J. A. Winchester and E. G. Rodgers, pp. 179-82.
32. Pre- and post-emergence weed control studies in cotton during 1952. By E. S. Hagood and R. R. Hodges, pp. 208-11. [See Abs. 1312.]
Observations are made (pp.231-6) on a number of new herbicidal materials and a summarized account is given of procedures, concerning which there is general agreement, for herbicidal use in different circumstances.—P.J.B.

## CROP BOTANY

[*See also under individual crops.*]

1392† Žukov, M. S. [**The influence of monovalent and divalent cations on the formation of lyophilic colloids in cells and tissues of plants.**] [Russian] *Doklady Akad. Nauk SSSR.* (*Proc. Acad. Sci. USSR*) 1953, **92,** No. 1, 169-72, bibl. 13. [Kursk Zonal Exp. Sta.]

This study was made with oats, maize and sugar-beet grown in culture vessels. [For the significance of the colloid complex in plant tissues see also *Herb. Abstr.* 19 : 570.]—M.H.

1393 Simonova, E. F. [**Viscosity of the plasma and water-holding capacity of leaves of agricultural plants.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **94,** No. 5, 965-8, bibl. 12, illus. [Voronež Agric. Inst.]

It has been claimed that viscosity of the plasma in plant cells is a feature which is related to plant growth stage, drought resistance, nutrient supply and varietal characteristics. The author employs the two usual methods (use of the centrifuge and plasmolysis) to study plasma viscosity in leaf cells of sugar-beet and fodder-beet (varieties Eckendorf and Mammoth), and of the herbage plants : clover, lucerne and sainfoin. It is concluded that for all these plants : (1) the plasmolysis method is more reliable than centrifuging ; (2) plasma viscosity of old leaves is greater than that of young leaves ; (3) water-holding capacity of the leaves is directly related to viscosity of the plasma, and this capacity in sugar-beet leaves is greater than that of the herbage plants ; (4) plasma viscosity may be used as a criterion of varietal distinction in plants and of their growth stage.—M.H.

1394 Konarev, V. G. and Slepčenko, N. V. [**The role of light in the formation of nucleoproteins in vascular plants.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **95,** No. 2, 321-4, bibl. 11. [Čkalov State Pedagog. Inst.]

In recent years, many authors have demonstrated the role of light in protein synthesis of vascular plants. It is recognized that the generation of protein substances is accompanied by the transformation of nucleic acid and its derivatives. The influence of light on this process has been studied by the author with pea seedlings (grown in cultures, with and without daylight). There is evidence that, under the conditions of the tests, in the absence of light the intake of phosphorus by the seedlings is retarded and synthesis of nucleoproteins is weakened. The mechanism of this action of light has not been elucidated, but it is postulated that the connexion between light on the one hand and the character of protein metabolism in plant cells on the other, is conditioned directly by a whole series of substances generated by photosynthesis. —M.H.

1395 Leopold, A. C. and Guernsey, Frances S. **Flower initiation in the Alaska pea. II. Chemical vernalization.** *Amer. J. Bot.* 1954, **41,** No. 3, 181-5, bibl. 14, illus. [Purdue Univ., Agric. Exp. Sta., Lafayette, Indiana]

The term chemical vernalization is tentatively proposed for the promotion of flowering by combined treatment of seeds or seedlings with a chemical substance and a low temperature. Experiments with Alaska pea have shown that a variety of auxins and of compounds which act as auxin synergists promote flowering. The cold treatment was provided by a temperature of 3°C. for 4 days. Devernalization was brought about by high light intensity (800 ft.-c.), heat (39°C. for 18-24 hr.), an atmosphere of nitrogen, or absence, even for 1 hour, of carbon dioxide after the cold period. It is suggested that the presence of $CO_2$ after the cold treatment is a second and essential stage in the vernalization process.—D.B.

1296 WENT, F. W. Klimaets indvirkning på planter. [**The effect of climate on plants.**] *Nat. Verd., Kbh.* 1954, **38,** No. 2-3, 55-70, bibl. 1, illus. [Earhart Pl. Res. Lab., Calif, Inst. Technol., Pasadena]

A review is given of studies at the Earhart Plant Research Laboratory, Pasadena, California, on the effect of controlled climate on plant growth, with particular reference to photoperiod and day and night temperatures. Observations are made on studies to determine optimum growth conditions for tomatoes and sugar-beet, and on the effect of atmospheric pollution, artificial light and air circulation on plant growth.—P.J.B.

1397† PATTERSON, J. B. E. **Smoke pollution and plants.** *N.A.A.S. quart. Rev.* 1954, No. 23, 93-9, bibl. 13. [NAAS, South-Western Prov.]

A review is given of the effects of smoke and tarry products, ash, grit and gases, with particular reference to $SO_2$ and other gases, on a wide range of plant species.—P.J.B.

1398† HULL, H. M. and others. **Fluctuations in sensitivity of the *Avena* test due to air pollutants.** *Pl. Physiol.* 1954, **29,** No. 2, 182-7, bibl. 15, illus. [Calif. Inst. Technol., Pasadena 4]

The cause of the diurnal fluctuations in sensitivity of *Avena* coleoptiles to auxin [IAA] were investigated and found to be due to impurities in the air. Exposure of the plants to synthetic smog invariably resulted in a decreased curvature, and the plants were most sensitive during the early stages of germination, i.e. during the first 2 days of growth. It is suggested that the cause of decreased response to applied auxin lies not in the destructive effect of peroxides and other air pollutants upon IAA, but rather in an effect on the growth response of the coleoptile itself. The test may be used as a quantitative assay for very low smog concentrations.—D.B.

1399 JAMALAINEN, E. A. **Overwintering of cultivated plants under snow.** *Pl. Prot. Bull.* 1954, **2,** No. 7, 102-5, bibl. 3. [Pl. Path. Dep., Agric. Res. Cent., Tikkurila, Finland]

Notes are given on the susceptibility of winter wheat, winter rye and winter-turnip rape [*Brassica campestris* var. *oleifera* subvar. *biennis*] to cold injury and to parasitic winter fungi in Finland. Trials have shown that winter-rye varieties grown in Finland are not very susceptible to cold injury, but are susceptible to snow mould (*Fusarium nivale*), against which seed dressing with fungicides has been effective. Winter-rye varieties most resistant to winter fungi in Finland have been Ensi, Toivo, Greus and the northern Russian strain Vjatka ; slightly less resistant strains have been Pekka, Oivi and Onni. Susceptibility of winter barley to *F. nivale* appears to be the main reason why this crop is not grown in Finland. Winter wheat is often injured by cold ; Olympia and Varma have shown resistance to *F. nivale*. All winter-turnip rape varieties, except Lembke, have shown fair resistance to winter cold. *Typhula* spp, and *Sclerotinia sclerotiorum* attack has rendered winter-turnip rape cultivation very hazardous except in the southern and western parts of Finland.—P.J.B.

1400 WARRINGTON, Katherine. **The influence of iron supply on toxic effects of manganese, molybdenum and vanadium on soyabean, peas and flax.** *Ann. appl. Biol.* 1954, **41,** No. 1, 1-22, bibl. 26, illus. [Rothamsted Exp. Sta., Harpenden, Herts]

The investigations were carried out in nutrient solution with iron as ferric citrate and nitrogen in the form of nitrate. Addition of 2·5 ppm. vanadium to plants in which iron chlorosis was already established, either by a lack of iron or by excess manganese, failed to counteract the condition, and caused toxic symptoms. Reduction of the standard iron supply to one-half or one-third accentuated the toxicity of 2·5 or 5 ppm. V to soyabean and flax, but a similar reduction in phosphorus had no influence. Toxicity to peas, however, was increased when the phosphorus was reduced to one-tenth provided the iron level was high (20 ppm. Fe). Raising the iron supply to 20 or 30 ppm. Fe counteracted the toxicity of manganese (10 ppm.), molybdenum (40 ppm.) and vanadium (2·5 ppm.), but the result was less marked when these three elements were combined. Iron supplied in successive, small doses proved less efficient in overcoming molybdenum or vanadium, but not manganese excess, than the same amount of iron supplied in fewer and larger quantities. Varying the iron supply had little effect when the concentration of the three elements was low. When increased iron supply had reduced the chlorosis caused by high manganese or vanadium, it also reduced the manganese and vanadium contents of the shoot (ppm./dm.), but the molybdenum content was only lowered by high iron when given in non-toxic concentration (0·1 ppm. Mo) combined with excess manganese. The iron content of the shoot (% dm.) was scarcely affected by the amount of iron supplied, but was generally reduced by high concentrations of manganese, molybdenum or vanadium. Results regarding the effect of vanadium on the phosphorus content of the shoot were conflicting, and differences occurred only when the iron supply was low. Here the phosphorus content of soyabean and peas was generally reduced, while that of flax was increased. Yield data for soyabean and flax indicated an interaction between manganese with both molybdenum and vanadium if the iron supply was low, but none between molybdenum and vanadium. The effect of all three metals was additive in respect to iron.—Author's summary.

1401 REDISKE, J. H. and SELDERS, A. A. **The uptake and translocation of yttrium by higher plants.** *Amer. J. Bot.* 1954, **41,** No. 3, 238-42, bibl. 8, illus. [Gen. Electric Co., Richland, Washington]

The absorption of yttrium by plants has been studied because of the large amounts of isotopes of yttrium produced during nuclear fission reactions. The test plants ((*Phaseolus vulgaris*, *Triticum vulgare*, *Salsola pestifer* and *Lycopersicum esculentum*) were grown in nutrient solutions in which $Y^{91}$ was used as a tracer, and the effect of factors such as pH and concentration on uptake were studied. In general, uptake was proportional to the amount of yttrium added. The experiments demonstrated that the isotopes of yttrium are not apt to be as important as other fission products in the hazard evaluation of fission-product absorption by plants but its uptake might be increased by plants growing in an acid soil.—D.B.

1402 TAMM, E. and SCHENDEL, U. Zur Frage der Stickstoffabgabe und -aufnahme durch Leguminosenwurzeln während des Wachstums. [**The secretion and absorption of nitrogen by the roots of leguminous plants during growth.**] *Z. PflErnähr. Düng.* 1954, **64 (109),** No. 2, 147-153, bibl. 5. [Tech. Univ., Berlin-Charlottenburg]

Field beans, lupins, peas and summer vetch grown in pot trials in 1952, and lupins in 1953, were studied for their secretion of N. The time at which N is secreted varies according to sp., and except in the case of peas, none was perceptible until the middle of June onwards, a time at which it is usually no longer of use to non-legumes growing with legumes. On the other hand, it was found that there was a considerable uptake of N in the form of nitrate by the legumes. The two findings throw light on the fact that non-legumes growing in association with legumes derive little or no advantage from the N secreted by the legumes.—G.M.R.

1403† MARTH, P. C. and others. **Growth-controlling effects of some quaternary ammonium compounds on various species of plants.** *Bot. Gaz.* 1953, **115,** No. 2, 200-4. bibl. 2, illus. [U.S. Dep. Agric., Beltsville, Maryland]

1404 WORT, D. J. **Effect of isonicotinic acid hydrazide on several higher plants.** *Science* 1954, **120,** No. 3106, 72-3, bibl. 4, illus. [Bot. Dep., Univ. B.C., Vancouver, Canada]

The results are given of studies on the effect of foliar spray, leaf immersion, immersion of scraped leaves and soil treatments with different concentrations of isonicotinic acid hydrazide, on the growth and enzyme chemistry of bush beans [*Phaseolus* sp.], oats, buckwheat [*Fagopyrum esculentum*] and sugar-beet plants.—P.J.B.

1405 MUDALIAR, C. R. and SUNDARARAJ, D. D. **Dormancy and germination of a few crop seeds.** *Madras agric. J.* 1954, **41,** No. 4, 111-19, bibl. 14. [Madras Agric. Dep., India]

Data on the germination, dormancy, and viability of seeds of rice, various millets, green gram (*Phaseolus radiatus*), black gram (*Ph. mungo*), sesame, cotton and green-manure crops in Madras State, are reviewed. Short-duration rice varieties germinated well in the first or second week after harvest: medium- and long-duration varieties had periods of dormancy after harvest varying from 3-13 weeks. Exceptions to these observations were PTB 7, a short-duration variety, which had a dormancy period lasting 9 weeks, and two long-duration varieties ADT 6 and ADT 7 which germinated well 6-8 weeks after harvest. The viability of different varieties is described; of the varieties tested, only Co. 1 maintained a high germinating capacity for longer than 13 months. In general, well-dried seed of the various millets remained viable for 2 years. *Ph. radiatus* and *Ph. mungo* retained a germinating capacity of 70% for storage periods of 7 years. Groundnuts stored in air-tight containers germinated well after 4 years; when stored normally in gunny bags their germinating capacity deteriorated after 12 months. Sesame seed retained its viability for 3 years when stored in air-tight containers. Surpluses of cotton seed can be retained until the following season, provided that they are kept well aired and dried.—W.J.B.

1406† ZELENY, L. **Determination of moisture content of seeds.** *Proc. int. Seed Test. Ass.* 1953, **18,** No. 2, 130-41, bibl. 8.

The most important basic methods of measuring the moisture content of seeds are described, including: oven, air-oven, water-oven and vacuum-oven methods, drying with desiccants, toluene distillation and the Karl Fischer method. Among practical methods reviewed are: direct heating, the Brown-Duvel distillation method, the calcium carbide method and the use of electric moisture meters.—P.J.B.

1407† BOTTINI, E. and TARANTOLA, C. Il metabolismo delle sostanze proteiche durante la germogliazione di cariossidi e semi,studiato per mezzo della cromatografia. [**The metabolism of proteins during the germination of caryopsides and seeds, studied by the chromatographical method.**] *Ann. Sper. agr.* 1954, **8,** No. 3, 809-35, bibl. 8, illus., English summary pp. 834-5. [Sta. Chim.-Agr. Sper., Torino, Italy]

This study of the amino acids in the proteins of wheat, pea [*Pisum sativum*] and flax seeds showed the presence of a fundamental group of 10 amino acids in all cases, and of a variable small number of other amino acids. There was also an indication of a different rate in the protein metabolism during germination, according to species.—E.B.O.

1408† HUYGENS, R. and CASIMIR, J. Séparation chromatographique sur papier du saccharose, du glucose, du fructose et du sorbitol. [**Paper chromatographic separation of saccharose, glucose, fructose and sorbitol.**] *Bull. Inst. agron., Gembl.* 1953, **21,** No. 3-4, 8-13, bibl. 10, illus.

The investigation was undertaken to find solvents which give a good separation of saccharose, glucose, fructose and sorbitol. Employing the 2-dimensional technique, satisfactory solvents were : in one direction, a mixture of benzene, butanol, pyridine and water in the ratio 1-5-3-3 ; in the other direction, either fuseloil, pyridine and water (1-1-2), or isopropanol, acetic acid and water (7-2-1). In the one-dimensional technique, the two first-named solvents were employed. The technique has been employed for farm crops including clover, maize and the roots and tops of carrot.—D.B.

1409† BREWER, H. E. **A device for continuous aeration and nutrient renewal of entire plants under sterile conditions.** *Pl. Physiol.* 1954, **29,** No. 2, 196-9, bibl. 16, illus. [State Coll. Washington, Pullman]

1410† WILLIAMS, R. F. **Estimation of leaf area for agronomic and plant physiological studies.** *Aust. J. agric. Res.* 1954, **5,** No. 2, 235-46, bibl. 6, illus.

A method based on leaf photographs is described for the estimation of leaf area. The method of preparing the standards is described and a set of standards covering the full range of leaf form in the young plants of a tomato variety are illustrated on coloured plates.—W.J.B.

1411† BALKS, R. and REEKERS, I. Zur Methodik der Nitratbestimmung in Pflanzensubstanz. [**A method of determining nitrate in plant material.**] *Landw. Forsch.* 1954, **6,** No. 2, 121-6, bibl. 2. [Joseph-König Inst. Landwirtschaftskammer, Westfalen-Lippe, Münster i w.]

Owing to certain disadvantages in the use of 1 : 3 : 4-xylenol as a reagent in the microchemical determination of nitrogen in plant material, a method has been developed by which this reagent is replaced by 1 : 2: 4-xylenol. The method is simple and quickly carried out, one determination taking 1·5 hours. Results are tabulated for hay, rye, lucerne, potatoes, and sugar-beet (all air-dried and finely ground). In the case of sugar-beet, the procedure had to be slightly modified.—D.B.

1412† TINTOMETER LTD., SALISBURY. **The determination of DDT on plant materials by means of the Lovibond Comparator.** *Leafl. Pt 3, Sect. 34. Tintometer, Ltd.* [n.d.], pp. 2. [Received June, 1954]

A colorimetric chemical method is described for determining the DDT residue in plant materials.—E.B.O.

1413† PENDLETON, R. C. and GRUNDMANN, A. W. **Use of $P^{32}$ in tracing some insect-plant relationships of the thistle, *Cirsium undulatum*.** *Ecology* 1954, **35,** No. 2, 187-91, bibl. 5. [Dep. Zool. and Ent., Univ. Utah, Salt Lake City]

The use of $P^{32}$ inoculations made to plants, as a means of tracing different relationships between plants and insects, is reviewed.—P.J.B.

1414† KØIE, M. E. **A self-recording light integrator and a portable integrator for light-percentage measurements.** *Oikos* 1952-3, **4,** No. 2, 178-86, bibl. 10, illus. [Bot. Lab., Univ. Copenhagen, Denmark]

The instrument described is operated from A.C. mains and is designed for the stationary measurement of light over long periods of time. The instrument is in two parts, the first of which contains an electronic light integrator, with provision for direct measurement of light intensity, while the second part is a motor-actuated mechanism for automatically registering the date, time and sum of light-energy units.—P.J.B.

## MISCELLANEOUS

1415 GREAT BRITAIN. National Institute of Agricultural Botany. **Guide to varieties of field and vegetable crops under trial, observation and propagation.** 1954, pp. 78. [Cambridge]

1416† GOLD COAST. University College. **Guide to the Agricultural Research Station, Nungua,** 1954, pp. 20, map.

1417† COWDRY, W. A. R. **The Ayr Regional Experiment Station.** *Qd agric. J.* 1954, **78,** No. 3, 141-50, illus.

The programme of investigations of this Experiment Station is designed to provide information of assistance to farmers on the alluvial Burdekin Delta in Queensland and for the extended cropping which will be possible after completion of the Burdekin dam. Brief accounts, chiefly consisting of results of varietal trials and of yield data, are given of the following crops among others : cotton, maize, sorghum, sunflower, potatoes, linseed, wheat, oats, groundnuts, tropical and subtropical legumes, and irrigated pastures. " Under the unique combination of a very wet midsummer to provide ample subsoil moisture, supplementary irrigation for the drier periods, and mild winter temperatures, it has been possible to harvest high yields of out-of-season summer crops within a few weeks of harvesting winter cereals. Yields of 2000 lb. of seed cotton, 1078 lb. of sunflower seed and 120 bu. of maize per acre were obtained, while wheat yielded 40 bu. of grain per acre and oats gave satisfactory crops of hay. The development of practices for such unusual agricultural and horticultural production timetables is receiving careful attention at the Station and many of the results will be applicable to the extensive areas of land to be utilised in the vast Burdekin irrigation project."—D.B.

1418 † UNESCO. Division of Scientific Research, Department of Natural Sciences. **Directory of Institutions engaged in arid zone research.** 1953, pp. 110. [Paris]

1419 † Great Britain. National Institute of Agricultural Botany. Seed Production Committee. **Seed notes. No. 47 and 48.** 1953, pp. 8 and 7.

1420 Nijdam, F. E. **Research on varieties on behalf of the registration.** *Neths J. agric. Sci.* 1954, **2**, No. 2, 88-97, illus. [Neths Govt Inst. Res. Var. Fld Crops]

The procedure by which varieties of field crops in the Netherlands are registered (to establish the breeder's rights over a variety) and entered on the List of Varieties (after field tests) is described.—W.J.B.

1421 † Bieberdorf, G. A. **The mole and its control.** *Circ. C-136. Oklahoma agric. Exp. Sta.* 1953, pp. 8, illus.

Brief recommendations are given for the control of moles, using poison bait, traps, gas and repellents. —P.J.B.

1422 Giang, P. A. **A bibliography of systemic insecticides.** *Publ. E-874. U.S. Dep. Agric., Agric. Res. Serv., Ent. Res. Br.* 1954, pp. 46.

This bibliography contains 455 items.—P.J.B.

1423 Martin, H. **Guide to the chemicals used in crop protection.** *Publ. Canad. Dep. Agric.* 2nd edn, 1953, pp. 295.

This is a revised and extended version of the first edition, produced in October, 1951. The version reported in *Fld Crop Abstr.* 6 : 1160 was an interim revision.—P.J.B.

1424 Leben, C. and Keitt, G. W. **Antibiotics and plant disease. Effects of antibiotics in control of plant diseases.** *J. agric. fd Chem.* 1954, **2**, No. 5, 234-9, bibl. 84. [Pl. Path. Dep., Univ. Wisconsin, Madison]

1425 Reith, J. W. S. and Cooke, G. W. Society of Chemical Industry, Agricultural Group. **Recent advances in fertilizer placement.** *Chem. and Industr.* 1954, No. 26, 753-5. [Macaulay Inst. Soil Res., Aberdeen and Rothamsted Exp. Sta.]

In the first paper, by Dr. J. M. S. Reith, a general review was given of placement experiments in north-east Scotland in 1947-52. Placing fertilizers up to 3 in. from the side of swede seed and up to 3-3·5 in. below the soil surface was compared with broadcasting. Placing superphosphate directly below the seed at a depth of 3-3·5 in. below the soil surface consistently gave better yields than placing it in other positions or broadcasting. With potash and mixed NPK fertilizers there appeared to be no advantage in placing the fertilizers. In the second paper, read by Dr. G. W. Cooke, similar experiments with various crops in England were reviewed. Fertilizers containing P and K drilled with cereal seeds gave greatly increased yields compared with broadcast fertilizers. Where mechanical potato planters were used on flat land, fertilizer in bands beside the seed potatoes gave better yields than broadcast fertilizer. Placement also gave better results than broadcasting in the case of peas and beans. NPK fertilizer placed beside sugar-beet, mangel and kale seed gave better early development, but no better final yield, than broadcasting. Placing PK fertilizers in bands beside lucerne seed was not superior to broadcasting, but placing superphosphate beneath lucerne seed gave better yields than broadcasting it.—W.J.B.

1426 Great Britain. Natural Resources Technical Committee. **The use of towns' wastes in agriculture. A study by the Natural Resources (Technical) Committee.** 1954, pp. 25, bibl. 20, London ; H.M.S.O., 1s. 3d.

This Committee has concerned itself with the possible value to agriculture of the waste products of our towns. It has endeavoured, (a) to estimate the amount of towns' wastes in England and Wales actually and potentially available for agriculture, (b) to estimate the plant-nutrient and humus-forming contents of these wastes, (c) to estimate the amount and nutrient content of composts that might be prepared from the wastes, (d) to compare the size of the contribution these wastes are likely to make to agriculture with normal farm manurial practice, and (e) to assess the value of these wastes in agriculture. An examination of crop yields over the last 50 years lends no support to the contention that the fertility of our land is declining and could be assisted by an extended use of towns' wastes. Organic matter added to the soil in normal farming practice is some 15·7 million tons per annum with a potential reserve of 59 million tons of organic matter in grassland. The organic matter in unused towns' wastes amounts to 0·75 million tons per year.—C.L.S.

1427† KRICK, I. P. **Weather modification and its value to agriculture and water supply.** *J. roy. Soc. Arts* 1954, **102,** No. 4924, 447-68, illus. [Amer. Inst. Aerol. Res.]

After giving an historical background, the author reviews the principles and practice of cloud seeding. By this means, increases in natural precipitation of between 20 and 80% have been obtained. The agricultural value of cloud seeding is not easily assessed but relationships with production of herbage and range pastures have been established. At the Desert Experimental Range, Utah, herbage production increased about 46 lb. (dry weight) per acre with each additional inch of precipitation.—D.B.

1428† MAYNE, J. E. **Progress in the mechanization of farming in Colonial Territories. A visit to Central Africa, East Africa and High Commission Territories.** *Trop. Agric. Trin.* 1954, **31,** No. 3, bibl. 9. [Colon. Agric. Mach. Adv. Comm., Colon. Office, London]

The high cost of mechanization in Central and East Africa is stressed, attention being drawn to the cost of repairs and supervision, and to the lack of adequate servicing arrangements. Special machinery for the following purposes is described: rice cultivation, transplanting and husking; tie-ridging; shrub and herbage cutting; ploughing-in mulch (double-cut ploughs). It is pointed out that much progress can be made by the improvement of hand tools, simple implements and harness.—W.J.B.

1429 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. National Advisory Service. **Plough setting.** *Fm Mach. Leafl. 6. N.A.A.S.* [n.d.], pp. 6.

1430† HOPP, H. **A guide to extensive testing on farms. Pts. I, II, III and IV.** *U.S. Dep. Agric. For. Agric. Serv.* 1954, pp. 27 (Pts. I and II), 69 (Pt. III), and 36 (Pt. IV).

These hand-books are intended for the use of workers concerned with testing agricultural practices or crops on farms on an extensive scale. This type of work is described as "extensive testing" and has as its object the testing of findings made by Experimental Stations on a wide variety of farms in a given region, with the intention of determining whether the said findings can be used as the basis of practical recommendations. Aspects considered include plot layout and number, the number of farms to be used, field procedures and methods of determining optimum plot size.—P.J.B.

1431† VOS, J. W. E. Een productiviteitsindex voor de akkerbouw. [**Index numbers of agricultural productivity.**] *Landbouwk. Tijdschr., Wageningen* 1954, **66,** No. 7, 451-8, bibl. 4, English summary p. 458.

1432† HEADY, E. O. and SHRADER, W. D. **The interrelationships of agronomy and economics in research and recommendations to farmers.** *Agron. J.* 1954, **45,** No. 10, 496-502, bibl. 10, [Iowa Agric. Exp. Sta., Ames]

Two concepts of production economics and their relationship to research procedures and recommendations to farmers are discussed. They are: (a) the input-output, or production function concept, which relates the output of a product to the input of material or resources, and (b) the substitution, or production possibility, concept. Hypothetical and practical examples of the use of these concepts are given.—P.J.B.

1433† SALMON, S. C. **Random versus systematic arrangement of field plots.** *Agron. J.* 1953, **45,** No. 10, 459-62, bibl. 17. [Cereal Crops and Dis. Div., Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

Aspects reviewed include: estimates of error and real error, random designs and unexpected disturbances, the use of estimates of error in systematic arrangements, difficulties of management in random arrangements, and random arrangements and designs of experiments. It is concluded that random arrangements of field plots may be desirable for eliminating bias, or in theoretical statistical studies, where the best possible estimate of error may be regarded as of equal, or greater, importance than a low real error. In many cases, randomized layouts are regarded as less suitable than systematic layouts, and may introduce new sources of error greater than those they are designed to eliminate. It is thought that there is a large class of experiments where sowing and harvesting are done by hand, in which there is little to choose between random and systematic layouts, provided that the use of random layouts does not directly or indirectly introduce error.—P.J.B.

1434† FREY, K. J. and others. **Prepunching of I.B.M. cards with plot code numbers.** *Agron. J.* 1954, **46,** No. 3, 140-1, illus. [Iowa State Coll., Ames]

A note is given on a method of eliminating manual key punching of plot codes on I.B.M. cards, by prepunching them on a gang punch machine, using a set of master cards.—P.J.B.

# BOOKS AND REPORTS

## BOOKS

1435† AIYER, A. K. Y. N. **Field crops of India, with special reference to Mysore.** 3rd edn, 1950, pp. 686, bibl. 79, illus., Bangalore ; Print. and Publ. Co., Ltd., 23 × 15 cm., RS. 20 [£2 or $8]. [Received 1954]

This book remains the only full account in English of the field crops of India, including arable fodder crops. In the case of each crop an account is given of its geographical distribution in India, suitable soils, rotation, cultivation, yields, pests, diseases, botany and varieties. There are also notes on the uses, national production and place in commerce of each crop.—W. J. Baulkwill.

1436† CURWEN, E. C. and HATT, G. **Plough and pasture. The early history of farming.** 1953, pp. xi + 329, New York ; Henry Schuman, Inc., 23 × 15 cm., $5·00.

The acquisition of the arts of agriculture and stockbreeding lies at the foundation of civilized existence. When and where did man first practice these arts ? What kinds of plants and animals did he first domesticate ? What new tools and skills did he acquire for these arts ? The authors attempt to answer these questions. They describe the quest for food, the origins of agriculture and stockbreeding and the spread of this knowledge, which denoted a new way of life, in Europe, Asia, Africa and the New World. Chapters on harvesting and milling bring the narrative to the threshold of the machine age. The book, which is well illustrated, is in two parts ; the first is entitled *Prehistoric Farming in Europe and the Near East* and the second, *Farming of Non-European Peoples*. Each part has its own selected bibliography.

1437† USSR, Academy of Sciences. Committee for the Study of Productive Power. [**Alternate husbandry in the Republics of (Soviet) Central Asia.**] [Russian] *Transactions of the Aral/Caspian Expedition* 1953, Part. 1, pp. 197, bibl. 18, illus., Moscow; Acad. Sci. USSR, 22 × 15 cm., 9 roubles, 60 kopeks= approx. 19s.

During the last five years many expeditions have been made into the territory of the Syr-Darya and Amu-Darya to study the possibility of developing agriculture in this region, with special reference to cotton and other irrigated crops. This booklet contains information collated by workers in the All-Union Scientific Institute for Cotton Research (SojuzNIHI) on the introduction of a grass/arable farming system in this area, the following papers being included : (1) The teaching of V. R. Williams on a ley/arable system of farming for irrigated areas, applied to Central Asia, by P. A. Letunov ; (2) Grey-earth soils and a grass/arable rotation, by A. N. Rosanov ; (3) A grass/arable rotation and irrigated cotton production, by I. A. Dorman ; (4) Tillage for cotton rotations, by F. A. Sokolov ; (5) An irrigation system for cotton, by V. E. Eremenko ; (6) Effected changes in the nature of the cotton plant, and principles of regionalization of cotton varieties, by B. P. Straumal ; (7) Use of a machine-tractor park and mechanized agriculture under irrigation in the republics of Central Asia, by A. A. Ivančenko ; (8) Experimental introduction of a cotton/lucerne rotation in the collective farm " Kyzyl-Šark", by M. I. Noskov ; (9) Forest improvement measures in Uzbek SSR, by F. K. Kočerga.—M. Hall.

1438† PRESTON, J. F. **McGraw-Hill Rural Activities Series. Developing farm woodlands.** 1954, pp. xiii + 386, bibl. 130, illus., New York (Toronto, London) ; McGraw-Hill Book Co., Inc., 24 × 16 cm., 36s.

This is a simple, copiously illustrated, handbook for farmers on the planting and management of farm woodlands.

1439† NICHOLSON, H. H. **The principles of field drainage.** 2nd edn, 1953, pp. xi + 163, bibl. 15, illus., Cambridge ; Univ. Press, 22 × 14 cm., 18s.

The author's aim has been to draw attention to the fundamentals of field drainage and the factors involved without recourse to the technicalities of surveying and engineering. The book is based on the results of ten years' study of field-drainage problems and is a very useful addition to the few that have been written on this subject.—C. L. Skidmore.

1440 ROE, H. B. and AYRES, Q. C. **Engineering for agricultural drainage.** 1954, pp. xvii + 501, bibl. 167, illus., London [New York, Toronto] ; McGraw-Hill Book Co., Ltd., 24 × 16 cm., 60s.

1441 UNITED STATES Department of Agriculture. **Plant diseases.** *Yearb. Agric.* 1953, pp. 940, illus., Washington ; U.S. Govt Print. Office, 24 × 15 cm., $2·50.

1442† FREAR, D. E. H. **Pesticide handbook,** 1954, pp. 196, Pennsylvania ; Coll. Sci. Publ., 23 × 15 cm., $1·25.

This is the 6th edition and contains 5763 listed items.—P. J. Boyle.

1443 COLSTON RESEARCH SOCIETY. **Proceedings of the sixth symposium of the Colston Research Society. 1953. Insecticides and colonial agricultural development.** 1954, pp. 169, bibl. 69, illus., London ; Butterworths Publ. Co., 25 × 19 cm., 30s.

Sixteen papers on different aspects of crop and animal protection in British Colonial Territories are presented, together with accounts of the discussions which followed the papers. The book contains critical accounts of crop protection and insecticide research policy in the colonies as well as descriptions of the techniques used in particular territories and for the protection of particular crops and animals. Six of the papers deal with crop protection in African territories, and one paper deals with the use of insecticides in the Caribbean. There are no papers which treat specifically the problems of Malaya, East Indian or South American territories. The last two papers in the book deal with spraying technique and machinery and insecticide manufacturers' research and supply problems. [Abstracts of sections of the book will be found in Abs. 1173, 1185 and 1320.]—W. J. Baulkwill.

1444† ARNON, D. I. [Ed.] **Annual Review of Plant Physiology. Vol. 5.** 1954, pp. 399, Stanford, Calif. ; Ann. Rev., Inc., 23 × 16 cm., $7.

Among papers noted are the following :

1. Nutrition by foliar application. By D. Boynton, pp. 31-54, bibl. 82.
2. Soil conditioners. By J. H. Quastel, pp. 75-92, bibl. 74.
3. The role of plant physiology in plant geography. By H. L. Mason and P. R. Stout, pp. 249-70, bibl. 49.
4. Occurrence, formation, and inactivation of auxins, By S. A. Gordon, pp. 341-78, bibl. 272.—P. J. Boyle.

1445† GRAY, E. A. **Microbiology. An introduction.** 1954, pp. 175, bibl. 100, illus., London ; Crosby Lockwood, 19 × 12 cm., 10s. 6d.

The book is a general introduction to the subject, written in the light of recent knowledge, and suitable for students. Separate chapters are devoted to viruses, bacteria, algae and protozoa and there is a chapter on yeasts, moulds and fungi. There is a clear account of the more important aspects of soil microbiology and a brief description of the microbiological processes involved in silage-making.—W. J. Baulkwill.

1446† NICHOLAS, D. J. D. **Chemical tissue tests for determining the mineral status of plants in the field.** 1953, pp. 33, illus., Salisbury, England ; Tintometer, Ltd., 21 × 13 cm., 8s. 6d. [Received 1954]

The tissue-test technique devised at Long Ashton Research Station for the chemical diagnosis of mineral disorders in plants, using the Lovibond Comparator field kit, is described in detail. The technique involves the extraction of mineral nutrients from fresh plant tissues by a diffusion process. The extracts are tested chemically by means of colorimetric or turbidimetric methods.—W. J. Baulkwill.

1447† CHILEAN NITRATE EDUCATIONAL BUREAU, INC., N.Y. **Bibliography of the literature on the minor elements and their relation to plant and animal nutrition. Vol. 3.** 4th edn, 1953, New York ; pp. 103, 28 × 22 cm.

[See also *Fld Crop Abstr.* 2 : 981, and 5 : 1334.]

## REPORTS

*The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.*

1448 **Great Britain.** Rothamsted Experimental Station. Report for 1953. Harpenden, 1954, pp. 227, 7s. 6d.

INVESTIGATIONS REPORTED :

1. Irrigation experiments on grass, sugar-beet, barley and potatoes. By R. K. Schofield, pp. 35-6. As a result of the plentiful rainfall and low rates of evaporation in the summer of 1953 the effect of irrigation on yields was much less than in 1952. [See Abs. 257]. Sugar-beet and barley did not benefit from irrigation. Irrigation increased potato yields by 2 tons per ac. at the low level of N application and by 2·7 tons per ac. at the high level of N application.
2. The effect of various types of phosphate on yields of potatoes and swedes. By E. M. Crowther, pp. 40-2. [See Abs. 1283.]
3. The effect of different methods of applying fertilizers to spring cereals. By E. M. Crowther, pp. 43-4. The effect of nitrophosphate on the yields of spring cereals was compared with that of an equivalent mixture of superphosphate and nitro-chalk, both lots being applied broadcast and combine-drilled. Nitrophosphate was of little value when broadcast ; when drilled it was still inferior to the superphosphate/nitro-chalk mixture.

4. Long-term effects of fertilizer treatments. By E. M. Crowther, pp. 44-5. On the Exhaustion Land of Hoos Field, where barley has been grown continuously for the last 12 years with nitrogenous fertilizer only, plots which received P and K annually in the years 1856-1901 yielded an average of 21 cwt. per ac. of barley per year during 1949-51 while plots which received no P or K in 1856-1901 yielded an average of only 10 cwt. per ac. of barley per year during 1949-51.
5. The use of actinomycetes in combating root-infecting fungi. By H. G. Thornton, pp. 64-5. Laboratory and pot experiments are being carried out in which the production of antibiotics antagonistic to root-disease fungi, particularly *Helminthosporium sativum*, by certain actinomycetes, is being studied.
6. The dependence on iron supply of manganese, molybdenum and vanadium toxicity to flax, soyabean and pea. By K. Warrington, pp. 68-9. [See Abs. 1400.]
7. Nutrient uptake by excised roots of barley in the presence of glucose, fructose and sucrose. By E. C. Humphries, p. 69.
8. The effect of foliar sprays on nutrient uptake by swedes and sugar-beet tops and on the grain yield of winter wheat. By G. N. Thorne and D. J. Watson, pp. 69-70. [See Abs. 1263.]
9. The germination and dormancy of wild oat seeds. By J. M. Thurston, pp. 71-2. [See Abs. 1374.]
10. The effect of virus yellows infection on transpiration by sugar-beet leaves. By P. C Owen, p. 73.
11. Sugar-beet virus diseases. By F. C. Bawden, pp. 88-91. Samples from all beds of sugar-beet stecklings sown in Great Britain were planted out and the plants tested for virus yellows infection ; 2·6% of the plants were infected. Spraying fodder-beet with 0·2% Parathion on 11 November, 1952, three days before lifting, prevented the infestation of fodder-beet clamps with aphids. In experiments at Rothamsted and elsewhere in 1950-3, the date of singling did not affect (with one exception) the incidence of virus yellows, but a heavier incidence of the disease was associated with late sowing (May) than with early sowing (March).
12. Irrigation and potato blight. By F. C. Bawden, p. 93. There was more infection on irrigated than on unirrigated plots.
13. The control of eyespot (*Cercosporella herpotrichoides*) and take-all (*Ophiobolus graminis*). By M. D. Glynne, pp. 94-5. [See Abs. 1114.]
14. The control of diseases of sugar-beet seedlings caused by *Phoma betae* and soil fungi. By L. F. Gates, p. 96. These diseases were greatly decreased by a seed dressing of Phygon dust (1%) and Dow 9B dust (0·5%) and by soaking the seed for 20 min. in ethyl mercury phosphate solution.
15. Sugar losses caused by mechanical harvesting of sugar-beet. By R. Hull and C. E. Cornford, p. 96.
16. Research on potato root eelworm (*Heterodera rostochiensis*). By B. G. Peters, pp. 97-102. Among the experiments reported is one in which the effect on eelworm populations of annual soil injections with DD was tested. A kill of 41% was recorded 12 months after plots were injected. [An earlier report on this subject will be found in *Fld Crop Abstr.* 6 : 828.]
17. Control of the vectors of potato virus by insecticidal sprays. By L. Broadbent and P. E. Burt, p. 115. Systox and Endrin were the most effective sprays used.
18. Control of wireworms by insecticides. By C. Potter and F. Raw, pp. 115-16. [See Abs. 1115.]
19. Survey of rabbit damage to winter wheat. By F. Yates, p. 134. [See Abs. 381 for an account of the survey.]
20. Deep-ploughing and crop yields. By E. M. Crowther and others, p. 140. Plots deep-ploughed over a period of 10 years yielded 2 tons per ac. more sugar-beet than plots which were shallow-ploughed over the same period.
21. Ley arable experiments by E. M. Crowther and others, pp. 140-2. [See Abs. 1359.]
22. Late nitrogen applied to cereals. By E. M. Crowther and others, pp. 144-5. [See Abs. 1222.]
23. The use of farm-yard manure on potato crops. By E. M. Crowther, p. 145.
24. The effect of different methods of applying fertilizer on the yield of potatoes. By E. M. Crowther, p. 146. In 1953, placing fertilizer near the seed potatoes gave no higher yields than did broadcasting the fertilizer. [In previous years, as reported in Abs. 188, placed fertilizer gave higher yields than broadcast fertilizer.]
25. The effect of the soil-conditioners Krilium CRD-189, Merloam and Aerotil on yields of carrots. By E. M. Crowther, pp. 146-7. The soil conditioners gave moderate increases in yield at Woburn and no increases at Rothamsted.
26. Results of trials with maize. By H. H. Mann, pp. 159-60. A Dutch hybrid variety gave 31 cwt./ac. of dry corn, harvested in November.
27. Recent work on molybdenum and some micronutrient interactions. By K. Warrington, pp. 181-7. —W.J.B.

1449 **Paris.** Institut National de la Recherche Agronomique. Travaux éffectués par les Stations Agronomiques en 1952. [Work of the Agronomic Stations in 1952.] *Ann. Inst. nat. Rech. agron., Paris. Sèr. A. Ann. agron.* 1953, **4,** No. 6, 801-1019. [Received April, 1954]

INVESTIGATIONS REPORTED :

1. Variations in the chemical composition of wheat leaves at flowering. By P. Buron, Blois, pp. 852-4. The analysis, when wheat is in full flower, of the lamina of the second leaf from the ear

downwards appears to be particularly interesting for studying the effect of a manurial treatment.

2. Study of the evolution and of the mineral nutrition of grain maize in Beauce. By P. Buron, Blois, pp. 854-6. In addition to studying the absorption of minerals by the maize plant and its manurial requirements, the author compared the chemical composition, at maturity, of the cob and of the green parts of the plant, concluding that the ploughing in of the latter after harvest is useful in restoring to the soil an important part of the elements taken up by the crop.

3. Effect of certain oligo-elements on the germinative faculty of seeds presenting abnormal or broken germs. By J. Guérillot, A.-J. Guérillot-Vinet and J. Baron, Grignon, pp. 862-3. Studies with *Trifolium incarnatum* showed that germination could be increased by about 50% by treating the seed with approximately 0·3 g. of $MnSO_4$ per kg. Other trials with lucerne and *Trifolium pratense* have given similar results.

4. Subterranean irrigation trials with maize at Dijon. By M. Mathieu, Dijon, pp. 867-9. The weight of the non-irrigated maize harvested was less than 10-20% of the irrigated. It remains to be studied whether the technique would be remunerative.—G.M.R.

1450 **Belgium.** Gembloux, Station de Recherches de l'Etat pour l'Amélioration des Plantes de Grande Culture. [Plant Breeding Station, Gembloux.] *Rev. Agric., Brux.* 1953, **6,** No. 12, 1700-35. [Received Jan., 1954]

INVESTIGATIONS REPORTED :

1. Barley, pp. 1700-3. Trials show that winter barley should be sown not later than the last decade of September at not less than 80 kg. per hectare. The spring-sown barley Herta again showed its superiority over other spring varieties. Trials of sowing rate and spacing with Herta are reported.

2. Winter wheat, pp. 1704-6. Varietal trials from 1949-52 showed that the variety Ministre was superior to all others tested, while it was immediately followed in 1951 and 1952 by the new variety H280. R. The new variety Panter yielded more than other cold-resistant varieties tested. It seems particularly difficult to combine high productivity with winter-hardiness.

3. Spring-sown wheats, pp. 1707-10. The variety Alfy I is superior to the varieties at present grown in Belgium and its rust-resistant character was confirmed in 1952. Greater productivity and resistance to lodging, however, have been exhibited by the newly tried varieties Alfy II, Jufy I and Jufy II. Some other newly tried varieties with greater resistance to lodging and higher grain yield are listed.

4. Oats, pp. 1711-12. Varietal trials incorporating Gembloux-bred strains are described.

5. Flax for fibre and seed, pp. 1713-16. Varietal, manurial, and sowing-rate experiments are reported.

6. Horse-beans [*Vicia faba*], pp. 1717-18. Spacing trials indicated that for small-sized beans the combination of 60 beans per sq. m. in 20-30 cm. (maximum) drills constitutes the optimal planting technique, and that early sowing and regular density diminish the risk of insect attack.

7. *Vicia sativa*, pp. 1719-24. In a seed-production trial, 11 different combinations of vetch and wheat, vetch and oats, and vetch and horse-beans were grown in comparison with vetch grown alone. The best results were obtained from the vetch/wheat combinations, the next best from vetch/oats. In varietal trials, Bourgas, a commercial variety of vetch, yielded most green weight but seed yield was better in some other varieties, Caucasus vetch in particular being distinguished by good yield both of green weight and seed. The variety is, however, variable.

8. Wheat, baking quality, pp. 1733-5. Tabulated information is given on the 1951 and 1952 harvests. —G.M.R.

1451 **Nigeria** Agricultural Department. Annual Report for the year 1951-52. Lagos, 1954, pp. 76, 9d.

INVESTIGATIONS REPORTED :

1. The effect of fertilizers on groundnuts grown on sulphur-deficient soils. By G. M. Higgins, pp. 26-7. At Kontagora, sodium sulphate (supplying the same amount of sulphur as 50 lb. per ac. calcium sulphate) applied to the soil 1-2 days before sowing increased the yields of groundnut kernels by 69% (or 518 lb. per ac.) and haulms by 91%, compared with no sulphate. Applications of ammonium chloride and sodium dihydrogen phosphate gave small increases in yields over untreated plots. At Samaru, similar applications of sodium sulphate gave increases of 19% and 46% in kernel and haulm yields, respectively. In further experiments, applications of sulphur in the forms of calcium sulphate, sulphur dust and sodium sulphate spray were generally equally effective in raising groundnut yields on soils deficient in sulphur.

2. Trials with local and USA sorghums. By O. J. Webster, pp. 33-6.

3. Groundnut variety trials at Samaru 1945-51. By A. R. Maurer, pp. 37-8. MK383 outyielded all other varieties, including the standard variety Castle Cary, in 1951, and gave the highest average yield of kernels for the period 1946-51.

4. Soyabean variety trials, 1952. By A. R. Maurer, pp. 38-9. The best yields of threshed beans were given by Bilomi No. 3 (1148 lb. per ac.), Misc. 94 (1088 lb. per ac.) and Bilomi No. 1 (1021 lb. per ac.).

5. Maize breeding in Nigeria. By O. J. Webster, pp. 41-4.

6. Maize breeding at Ibadan. By A. J. Vernon, pp. 44-5.
7. The effect of spacing on cowpeas [*Vigna catiang*]. By A. J. Vernon, pp. 45-6. Three spacing distances were tested: (a) 3 × 4 ft., (b) 1·5 × 4 ft. and (c) 2 × 2 ft. Spacing (a) gave more than double the yield from any other spacing when sowing was on 27 August; spacing (b) gave about double the yield from spacing (a) when sowing was on 17 Sept. These results were true both for the average of all varieties and for the highest yielding variety tested, New Era.
8. Collection of edible yams at Umudike. By T. A. Russell, p. 49.—W.J.B.

1452 **Kenya** Department of Agriculture. Annual Report for 1951, Vol. 2. Nairobi, 1953, pp. 170.

INVESTIGATIONS REPORTED:
1. The report of the Senior Plant Breeder, H. C. Thorpe, pp. 32-59, covers wheat-breeding at different altitudes, the breeding of barley, oats, soyabeans, sunflowers, maize, sorghum, and observations on oil-poppy, rape and linseed. Experimental work dealt with wheat rate-of-seeding trials, barley fertilizer trials, and maize variety trials, all of which are fully reported.
2. Experimental work in general husbandry, pp. 150-70. A test at Elburgon showed that methyl alpha naphthaleneacetic acid at 60 or 70 g. per ton was effective in reducing sprouting and loss of weight in stored potatoes. Other work was concerned with: the value of artificial fertilizer for increasing maize production in the Kiambu Reserve; the study of cassava varieties from Amani; comparisons of planting cassava on ridges and on the flat and at different spacings; studies of crop varieties (cassava, cotton, sorghum, *Urena lobata*), and their improvement in the Coast Province; rice, wheat, cassava and cotton trials in Nyanza Province.—G.M.R.

1453 **Tanganyika** Department of Agriculture. Technical and Specialist Officers' Reports for the year 1951. Dar es Salaam, 1953, pp. 93, 4s. [Received March, 1954]

INVESTIGATIONS REPORTED:
1. Empire Cotton Growing Corporation, Ukiriguru; Progress Report for the season 1950-51. By J. E. Peat, pp. 27-42. The restorative effect of a 3 years' "tumbledown" fallow was significantly greater than that of a similar fallow which had been planted with local grasses and legumes. Responses to 3 years' rest under resting variants were still evident in experiments in the 3rd, 5th and 7th years of cropping. Residual responses from single applications of organic manure have been significant up to the 7th season from application. Responses from superphosphate have lasted at least for 3 seasons from application. The value of applying N to cotton, as a top-dressing at flowering time, is confirmed. Good tied-ridges have given small increases in yield, significant in the case of bulrush millet, over poor ridges not tied; the residual benefit of compost has been greater with tied ridges. A new cotton seed issue, Uk. 51, was constituted. Hybridization is in progress to add resistance to bacterial blight to the Ukiriguru strains, and to improve the jassid resistance of some of them.
2. Annual report of the Plant Pathologist, Lyamungu, Moshi, for 1951. By G. B. Wallace, pp. 43-8. Potatoes: Irish blight continues to cause heavy losses, but some introduced Corstorphine strains are being tested in the Usambaras and one or two appear to be immune to the present regional strains of the fungus.
3. Kilangali Grain Farm, report for the year 1951. By N. R. Fuggles-Couchman, pp. 75-8. A pilot experiment in the growing of rice under irrigation is in progress.
4. Summary of the annual report of the Agricultural Officer (Experiments) Southern Highlands Province, 1951. By J. S. Gunn, pp. 81-6. Wheat trials were aimed at establishing economic levels of fertilizer applications.
9. Morogoro Farm Report. By C. G. Birch. pp. 87-90. Experimental work was concerned with selection of dwarf-type sorghum, planting dates for Enyanza sorghum, smut control, manurial trial on maize, cassava growing, and a rice varietal trial.
10. Dodoma Tribal Farm, pp. 91-3. Work included a millet cultivation trial, a mulching trial with millet, and varietal trials with groundnuts, sunflowers and sorghum.—G.M.R.

1454 **Tanganyika** Department of Agriculture. Annual Report 1952. Parts I and II. Dar es Salaam, 1953, pp. 104, 5s. [Agricultural Stations and Experimental Work, 64-86.] [Received Feb., 1954]

INVESTIGATIONS REPORTED:
1. Coffee Sub-Station, Mbosi, pp. 65. The Station also serves as a site for observation plots of other crops. Good results were obtained with buckwheat, Niger oilseed, oats and kudzu.
2. Sisal Research Station, Mlingano, pp. 66-9. In studying the effect on sisal yield of inter-planted food crops it was found that sorghum depressed sisal yields, maize did not do so significantly, and beans neither depressed nor raised yields.
3. Empire Cotton Growing Corporation, Ukiriguru, and Lubaga Sub-Station, pp. 69-70. This includes a report on the work of the Department's Botanist in the breeding of sorghum and rice and in a varietal trial of cassava. Uk. 48 and the new strain Uk. 51 yielded better than Uk. 46 in cotton trials throughout the Province.

4. Ilonga Agricultural Station and Empire Cotton Growing Corporation in the Eastern Province, pp. 70-2. Work comprised cotton selection and seed production, cotton-pest control with a dust containing 10% DDT and aphicide (BHC), improvement of maize and sorghum, observation and bulking of virus-resistant cassava clones, observation of soyabeans, hibiscus, lucerne and kudzu, and maize-seed production and distribution.

5. Field Experiments, Southern Highlands, pp. 72-3, included wheat varietal and cultural trials (fertilizer, time of planting, spacing, cultivation and picking).

6. Mechanization, general studies, pp. 74-5.

7. Mechanical cultivation schemes, pp. 75-7.

8. Mahiwa Experiment Station, Southern Province, pp. 78-9. The main work was connected with rice. Sorghum, cassava, soyabean and sesame were under observation.

9. Dodoma Tribal Farm, p. 80. Useful information was obtained on dwarf sorghums for the area, optimal planting period for cowpea, and the productivity of short-term groundnut varieties. Significant yield increases resulted from planting millet on tied ridges instead of on the flat.

10. Kungului Farm, Lushoto, is used primarily for the trial of Corstorphine potato varieties, one of which, imported from Scotland in 1949, is highly resistant or possibly immune to the regional strains of *Phytophthora infestans* and is to be multiplied in potato-growing areas. Pp. 80-1.

11. Morogoro Farm, pp. 81-2. Observation plots of hibiscus were sown. As elsewhere in the Territory, imported seed of *Hibiscus cannabinus* gave the most promising result.—G.M.R.

1455 **Nyasaland Protectorate** Department of Agriculture. Annual Report for the years 1952 and 1953. Part II. Zomba, 1954, pp. 34, 5s.

INVESTIGATIONS REPORTED :

1. Maize, pp. 4-6. In varietal trials, local selections yielded less than S. Rhodesian hybrids but had the advantage of keeping well in store [see *Fld Crop Abstr.* 6 : 1606]. They were flint or semi-flint types. Spacing trials showed 14,500 plants per acre to be necessary, and more in a wet year, but their arrangement is immaterial. The sodium salt of 2,4-D was successful in controlling weed grass in maize but also reduced the crop stand so that there was little increase in yield. Local maize strains were less susceptible to rusts than imported varieties.

2. Cassava, p. 8. Collection of local varieties and distribution of mosaic-resistant varieties.

3. Irish potatoes, p. 8. Observation plots and fertilizer trials. No advantage accrued from using farmyard manure in addition to NPK ; growth was slower and yield less.

4. Oil seeds, pp. 11-12. Groundnut spacing trials ended in 1952. Although yield was greater the more plants there were per acre, there is a limit above which it is not practical to go. Planting 2 seeds in each hole with a spacing of between 6 in. and 9 in. between holes should be aimed at. Varietal and fertilizer trials are also reported, together with seed dressing experiments for the control of *Cercospora* sp. Varietal trials were made of linseed, sunflowers, soyabeans, sesame and safflower. The last-named crop shows little promise in Nyasaland.

5. Empire Cotton Growing Corporation, Chitala, pp. 32-4. Results of Egyptian-type cotton trials in 1952 were disappointing, and it is not thought that they can compete with Uplands as a winter crop in Nyasaland. CL20 has proved at least as good a yielder as its parent CLB ; neither of the Tanganyika cottons tested surpassed them. The Uganda cottons seem less well-suited to Nyasaland summer-crop conditions. The two-level N manurial trial, continued from 1951, showed no treatment effects in 1952-3. Red bollworm attack has been studied in two localities and some reasons for the heavy damage in one of them are suggested.—G.M.R.

1456 **Rhodesia.** Agricultural Experiment Station, Salisbury. Annual Report of Experiments. Season 1952-1953. By A. G. H. Rattray. *Rhod. agric. J.* 1954, **51,** No. 1, 28-44.

INVESTIGATIONS REPORTED :

1. Trial with kenaf (*Hibiscus cannabinus*), p. 32. Egyptian, Brazilian (*H. kitaibelifolius*) and Cuban types of kenaf were grown in replicated trials. All were sown at planting distances of 18 × 3 in., 12 × 3 in. and 6 × 3 in. The Cuban type gave the highest yields of fibre (an average of 2082 lb. per ac. for all planting distances) and branched least. There was no consistent superiority of any one planting distance over the others.

2. Trials with rotations including maize, pp. 32-5. The results for 1952-3 and for 1946-53 are tabulated. The beneficial effect of kraal compost (including animal manure) on the crops was marked.

3. The effects of legumes (velvet beans) and grass in rotations on the yields of maize, pp. 35-7. The effect on maize yields of growing legumes at various intervals as green manure, for hay and for seed, was tested in 1939-53. Ploughing under the legume as green manure gave significantly better maize yields over the whole period than growing the legume for hay or seed. The effect on succeeding crops of ploughing in the legume crop was approximately equivalent to cutting the legume for hay before ploughing and applying 4-6 tons kraal compost. The system of growing maize and a green manure crop in alternate years gave the best total yields of maize at the lowest cost of production over the whole period. The yields of maize were low

following 3- and 4-year grass (*Panicum makarikari*) leys not receiving N or animal manure.

4. Hybrid maize strain trial, pp. 38-40.—W.J.B.

1457 **South Africa.** Witwatersrand University, Transvaal. Frankenwald Field Research Station. Annual Report for 1953. Johannesburg, pp. 48.

INVESTIGATIONS REPORTED:

1. Effect of super- and raw rock-phosphate mixtures on maize production. By R. E. Altona, pp. 37-9. For the third successive season there has been no significant difference in maize yields between any of the phosphate treatments. A side dressing of N increased yield by 22% over untreated maize, although weather conditions were unfavourable.

2. Maize experiment—nitrogen, rates of planting. 1952-53 season. By R. E. Altona, pp. 39-41. The plants in all the rates of planting required N, but, in order to capitalize on the N added, the planting rate should exceed 10,000 plants per acre.

3. Effect of trace elements on maize. By R. E. Altona, p. 42. Maize plants in a fertilizer experiment were sprayed with a 1% solution of $MnSO_4$ when about 20% of the plants had begun to tassel. The treatment appeared to have a slightly depressing effect on yield.

4. Old fallows experiment. By R. E. Altona, p. 43. Four morgen [1 morgen = 2·1165 ac.] of old fallows were fertilized and grazed for 5 consecutive summers, and one-quarter of each morgen was then ploughed and sown to maize in the following spring, with the object of ascertaining the length of time land should be left under the soil-building action of fertilized grass and the period of cropping before land should be returned to grass. The total yield of maize obtained from the 4 quarter-morgen was 3536 lb. grain. In each of the next three successive seasons, further quarter-morgen will be ploughed and cropped.—G.M.R.

# NEWS ITEMS AND NOTES

**Great Britain**

1458 UNIVERSITY COLLEGE OF WALES. The Department of Agriculture (Animal and Crop Husbandry), Department of Agricultural Botany, Department of Agricultural Chemistry and The Library, Department of Agriculture, of the above College have now been amalgamated under the title: The Institute of Rural Science. The address is: Penglais, Aberystwyth, Wales.—A.G.G.H.

**France**

1459 THE TEACHING OF TROPICAL AGRICULTURE IN THE FRENCH UNION. Education in tropical agriculture at the highest level, supplementary to a normal degree in agriculture or related sciences, is provided by the École Supérieure d'Application d'Agriculture Tropicale at Paris. The school is divided into sections for agricultural production and agricultural research, and the courses last 1 year. Members of the latter section are subsequently transferred to the Office de la Recherche Scientifique et Technique d'Outre-Mer which provides instruction (1 year in Paris and 1 year on the Ivory Coast) in specialized research in the various agricultural sciences. Education in tropical agriculture of a less advanced type is provided by the Cycle d'Enseignement d'Agriculture Tropicale which gives supplementary training in tropical agriculture to holders of diplomas of the various agricultural institutes of France, of the Agricultural School of Tunis, and, in special cases, of foreign institutes. *Trop. Agric., Trin.* July, 1954.—W.J.B.

**Belgium**

1460 THE 17TH CONGRESS OF THE INTERNATIONAL INSTITUTE FOR SUGAR-BEET RESEARCH was held in Brussels on the 23 and 24 February, 1954, under the presidency of J. Rasmusson of Sweden. The two main topics under discussion were the control of sugar-beet yellows and the physiology of the sugar-beet. Other papers dealt with the mineral nutrition of the sugar-beet, manuring, sowing methods, treatment of sugar-beet with maleic hydrazide, and cytology. *Publ. Inst. belge Amélior. Better.* January/March, 1954.—D.B.

**Aden Protectorate**

1461 PROGRESS OF THE ABYAN IRRIGATION SCHEME. The planned irrigation of the Abyan area of the Aden Protectorate, which receives only 2 in. rainfall per annum, was started in 1941. Since 1947, irrigation development has been in the hands of the Abyan Board, modelled on the Sudan Gash Board. Cotton production in the area has risen from 634,800 lb. from 1097 ac. in 1949-50 to an estimated yield of 8,000,000 lb. from 20,000 ac. in 1953-54. Other crops grown are sorghum, pigeon pea (*Cajanus indicus*) and *Dolichos lablab*. *Trop. Agric., Trin.* July, 1954.—W.J.B.

**Iraq**

1462† AGRICULTURE. The first census of agriculture in Iraq has now been completed under the supervision of the Government's British statistician, Dr. K. G. Fenelon, and many interesting facts about the structure of the country's agriculture are revealed for the first time. Out of a total area of 444,442 sq. km., only 63,844 sq. km., or 14%, are cultivated in agricultural holdings, the remainder being deserts (208,709 sq. km.), mountain lands, marsh lands or waste. Of the cultivated area, 25,270 sq. km. were planted and 27,947 sq. km. were lying fallow during the census year 1952-53, the remainder being utilized for fruit trees (1282 sq. km.), pasture (2309 sq. km.), woodlands (578 sq. km.) or waste land (6443 sq. km.). About half the farm lands are dependent on rainfall alone, these being located for the most part in the north. The other half depend on artificial irrigation, which is effected either by flow (58 per cent of the total irrigated lands), where the rivers are higher than the surrounding lands; or by pumps (38 per cent), or water wheels (2 per cent), where the river-level is below that of the fields. Miscellaneous but primitive methods of irrigation, for which baskets, manually operated buckets or animal-driven paddle pumps are used, account for the remaining 2 per cent. . . . Main crops are barley (12,100 sq. km.), wheat (10,460 sq. km.) and rice (1287 sq. km.). The most important industrial crops are cotton (24,100 hectares) and tobacco (10,200 hectares), the latter being grown almost exclusively in the northern provinces of Sulaimaniyah, Mosul and Arbil. Share-cropping is general, and there is a great weight of agricultural debt. Co-operation has made exceedingly slow progress: but efforts are now being made, with the assistance of foreign experts, to develop various forms of co-operation, to promote rural industries and to introduce facilities for 'fundamental education'. *Nature, Lond.* 29 May, 1954.

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